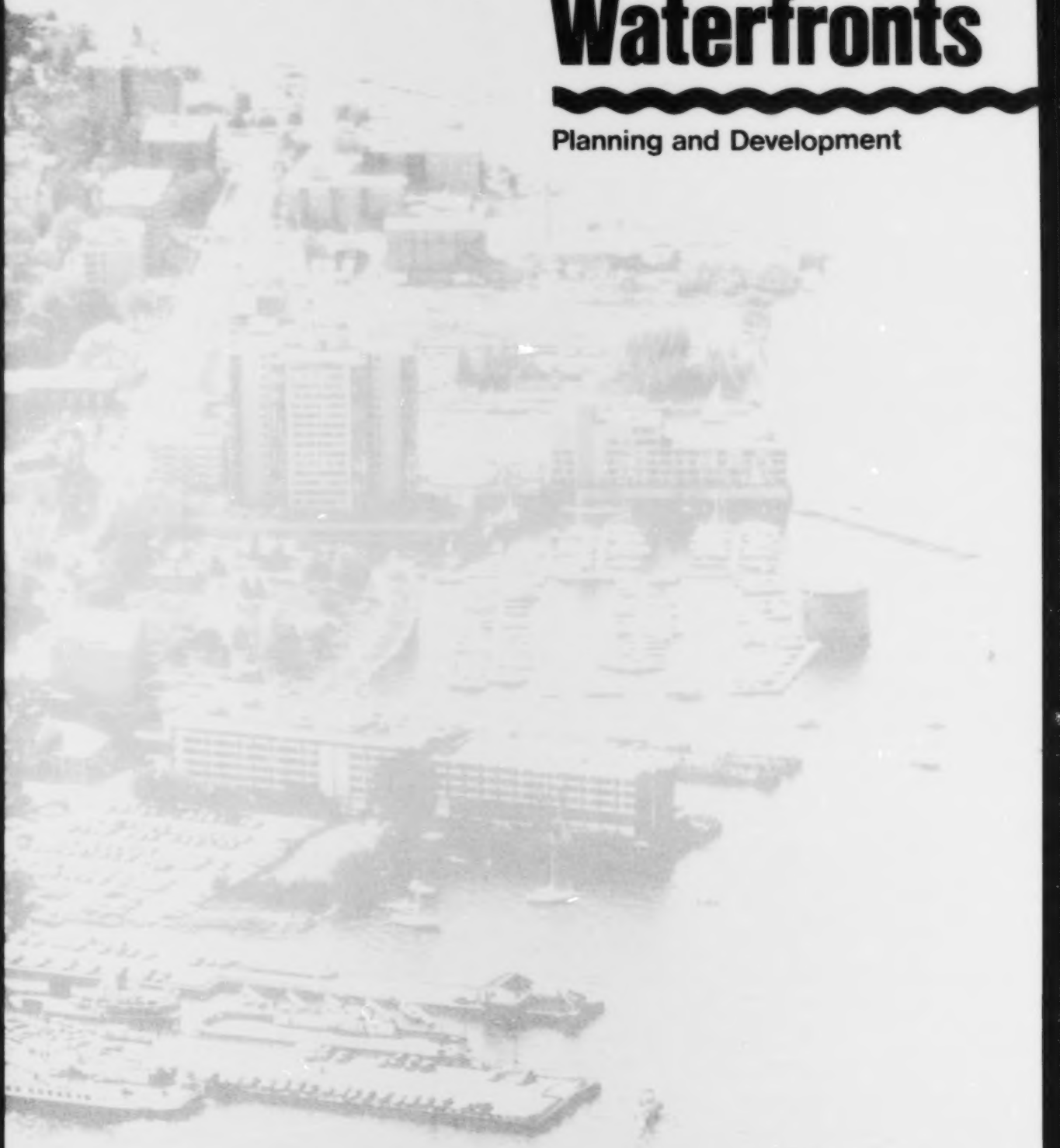
Urban Waterfronts

Planning and Development



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John Eakins, Minister

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Planning and Development

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TABLE OF CONTENTS

Preface ____ i

1. The Urban Waterfront Challenge ____ 1
- An Underutilized Resource ____ 1
- Benefits of an Improved Waterfront ____ 3
  - Economic Benefits ____ 3
  - Social Benefits ____ 5

2. Planning the Waterfront ____ 7
- Getting Started ____ 8
  - Clarifying the Jurisdictions ____ 9
  - Defining the Area ____ 13
  - Involving the Public ____ 14
  - Establishing Municipal Goals ____ 14
- Studying the Area ____ 14
  - Applying Interim Control and Temporary Use Bylaws ____ 15
  - Identifying Potential and Constraints ____ 15
  - Identifying Users and Needs ____ 17
  - Developing Specific Objectives ____ 17
  - Preparing Concept Plans ____ 19
- Carrying Out the Plans ____ 19
  - Municipal Policy ____ 19
  - Zoning By-laws ____ 20
  - Other Land Use Related Powers ____ 20
  - Car Parking ____ 21
  - Sign Control ____ 22
  - Heritage Conservation ____ 22
- Project Development ____ 22
  - Creating a Destination ____ 23
  - Development Initiatives: Public/Private Roles ____ 23
  - Operation and Maintenance ____ 25
  - Programming and Events ____ 25

3. Assessing the Waterfront ____ 27
- Land Use Issues ____ 27
  - Urban Context ____ 29
  - Relationship to the CBD ____ 29
  - Ownership ____ 30
  - Water-Dependency ____ 31
  - Existing Services ____ 34
  - Public Access Issues ____ 35
- Physical Characteristics and Features ____ 37
  - Terrain Conditions and Topography ____ 37
  - Hydrological Factors ____ 38
  - Environmental Quality ____ 40
  - Existing Shore Structures ____ 40
  - Microclimate and Special Site Conditions ____ 41
- Users and Their Needs ____ 42
  - Market Identification ____ 42
  - Boating Needs ____ 42
  - Tourism Demand ____ 42

4. Designing the Waterfront 45
Shoreline Protection 45
Revetments 46
Shorewalls 47
Groynes 47
Breakwaters 48
Landfill 48
Landscaping for Shoreline Management 49
Professional Advice 50
Public Access Areas 50
Plazas 52
Parks 52
Links and Paths 52
Public Viewing Areas 52
Fishing Piers 53
Beaches 55
Beach Area and Siting Considerations 55
Separation of Incompatible Activities 56
Recreational Boating 57
Marinas 57
Boat Launch Ramps 60
Landscaping the Waterfront 62
Plant Selection and Placement 62
Climate Mitigation 63
Urban Design 64
Mixed Use and Compatibility 64
Waterfront Focal Points 64
Human Scale 65
Views 65
Heritage Properties and Existing Features 66
Character and Interest 66
Safety and Convenience 66

5. Ontario Waterfront Projects 67
Recreational Boating 67
Housing 69
Shops, Offices, Hotels, Restaurants 70
Industries 71
Water and Sewage Treatment Plants 73
City Halls, Hospitals, Schools, Museums 73

Appendices 75
Examples of Waterfront Programming 75
Costs of Waterfront Improvements 77
References 80
Government Contacts 84
Resources 87

PREFACE

Throughout North America, waterfronts are enjoying a new prominence in the urban fabric as generators of commercial revenue, as places to live and as focal points for tourism development and recreational activities. Community planners have played, and will continue to play, a significant part in the identification of opportunities, and in the development of policies, plans and programmes to initiate changes on Ontario waterfronts. Nevertheless, despite the increasing recognition of the urban waterfront as a significant community resource, there is no single source of information available on waterfront planning as it applies to Ontario.

The purpose of this handbook is to provide a resource book for planners, and others in the community, who are interested in waterfront development. It promotes better utilization and integration of waterfronts into the urban setting by examining the many facets of waterfront planning and particularly the need to assess physical and economic potential. The first chapter gives an overview of the present waterfront situation in Ontario and the advantages to be gained from waterfront development projects. Chapter 2 explains how the planning process and related planning tools can assist a municipality in carrying out a waterfront project. Chapter 3 considers how to go about assessing the potential and constraints associated with a particular waterfront site and Chapter 4 provides planning and design guidelines for waterfront development, drawing in part on the experience of Ontario communities to date. Finally, Chapter 5 looks at a cross-section of projects that have been built in Ontario. The appendices provide examples of waterfront programming, some sample project costs, a listing of Ontario resources and reference materials, and a bibliography classified by subject.

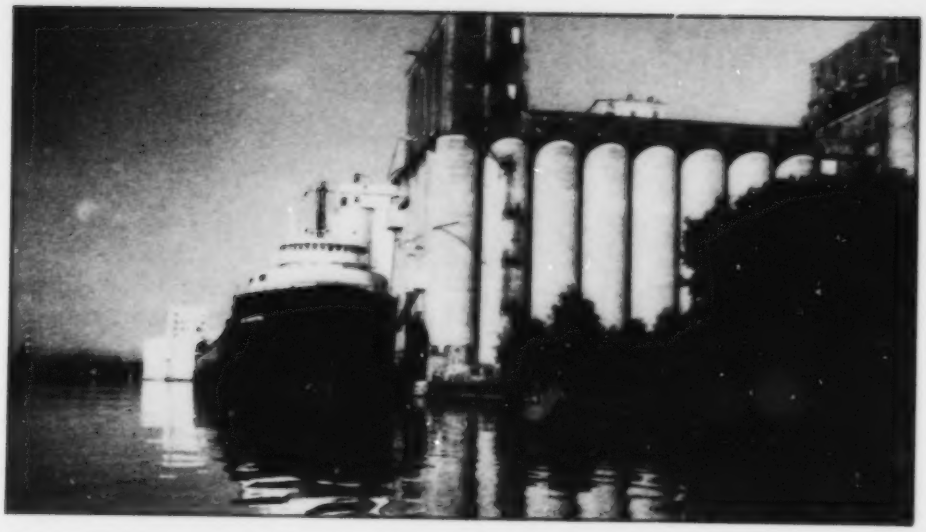
1.

THE URBAN WATERFRONT CHALLENGE

Urban waterfronts are a very special community resource which can provide unique and exciting opportunities to serve the diverse needs of many different groups. Just as downtown business areas have been improved in many municipalities across Ontario, urban waterfronts can also be better utilized to respond to particular needs and conditions. Because there are many different types of urban waterfronts, of widely varying size and location throughout the province, a broad range of opportunities is available.

AN UNDERUTILIZED RESOURCE

Richly endowed with water resources, Ontario has frontage on four Great Lakes, the St. Lawrence and Ottawa Rivers, several canal systems, major inland lakes such as Lake-of-the-Woods, Lakes Simcoe, Nipigon, and Nipissing, numerous smaller lakes in cottage areas, as well as countless other lake and river systems. In the past, when water was required as a power source for industry or for transportation purposes, waterfronts were valued for different reasons than they are today. Although water is a major feature of many new developments, and many communities are rec-



Grain elevators and grain ships are a familiar sight on Ontario waterfronts (Thunder Bay).

ognizing the potential of their waterfront lands, more often than not these lands are under-developed, vacant or simply used as parking lots. Sometimes, because of flood-plain restrictions, they may be minimally developed or left undisturbed. The result is that unused pockets of land may often be found tucked away right in the middle of a downtown.

Many of Ontario's waterfronts, particularly those located on major shipping routes, have undergone dramatic changes over the years. With diminished shipping and greater reliance on truck transportation to move supplies and materials, some communities have turned their backs on the water, using adjacent lands for parking and storage. Waterfront lands have even been used as dumping sites, thereby contributing to the negative waterfront image which pervades some waterfront communities. Railway lines, particularly the spur lines, have also contributed to the separation of many waterfront lands from the downtown.

At the same time, public concern about the environment has led to improvements in water quality and to the renewed availability of many lakes and rivers for recreational uses. In general, however, it is fair to say that most waterfront areas are underutilized even when located between two of the community's most important assets: the downtown commercial core and the water's edge.

Railway lines often separate the waterfront from the rest of the community (New Liskeard).

BENEFITS OF AN IMPROVED WATERFRONT

The economic and social benefits associated with development on the waterfront are many. New development can mean an increased tax base, as well as increased employment — both from construction and the operation and maintenance of new facilities. Improving the waterfront also provides a great opportunity to diversify and enhance the social well-being of a community. Places for public use and enjoyment can be provided which contribute to civic pride, an improved community image and enhanced economic advantages.

Restaurants and stores are beginning to take advantage of their waterfront locations (Perth).

ECONOMIC BENEFITS

If the waterfront is under-used or vacant, new development may be the catalyst to spark change in the entire area. Of course, new development, whether shops, offices, hotels or marinas, brings with it more tax revenue for the municipality, new jobs, and the potential for spin-off investment. On waterfronts in particular, new development is frequently directed at the tourist or boating markets which can expand the economic base of the area. However, it should not be forgotten that developing a previously undeveloped area will also involve additional costs to the municipality in terms of expanded services, such as sewers and watermains. If there is industry already located on the waterfront the municipality should consider the economic benefits to be derived from a plan which supports that industry in addition to encouraging new development.

TOURISM

A waterfront that has uses which are patronized by local residents is also likely to attract tourists. Therefore, it can be assumed that if a project provides activities, goods and services which will appeal to the locals, tourists will also want to visit it.

Ontario has many thriving waterfronts with activities which can be seen as incentives rather than impediments to tourism. The Great Lakes shipping industry is of interest to many people. For example, with one ship passing

Working tugboats are a feature of many Ontario waterfronts (Sault Ste. Marie).

The Trent-Severn waterway system is a favourite with holidaymakers (Fenelon Falls).

every eight minutes. Sarnia boasts the busiest inland waterway in the world. The Port Dover commercial fishing fleet is another example of an authentic use on the waterfront which gives the community a unique flavour and a special waterfront attraction.

Ontario's inland lakes, rivers and canals have considerable untapped tourist potential. The convenience and safety associated with these water systems can be further developed. The popularity of the Rideau and Trent canals demonstrates how valuable this resource can be, if suitable facilities and services are made available.

Tourism potential is affected by a number of factors:

- size of the waterfront
- type of waterbody
- the market and regional factors

Size is important as it will determine the physical potential of the waterfront as well as the extent to which the needs of both residents and tourists can be accommodated. The type of waterbody is a determining factor because, if it is navigable, it will be more likely to attract transient visitors. Regional influences will be a determinant because, if a coordinated effort is made, visitors may stay in an area for a longer period of time.

Improving the urban waterfronts of individual communities strengthens the overall attractiveness of the region. Regardless of community size, the economic benefits derived from tourism can be significant. Sometimes the smaller the community, the bigger the gains.

SOCIAL BENEFITS

Along with an improved image for the urban area as a whole, waterfront development can tackle broader community goals. Increased recreational opportunities for residents can be achieved, for example, by making provision for boaters and swimmers, as well as for cyclists, runners or walkers. Existing gaps in local recreational facilities can be filled and some conflicts may be addressed, such as the need to separate swimmers and boaters. Improving access to the waterfront by clearing up vehicular traffic problems, realigning streets or creating safer pedestrian routes to the water's edge may also be possible.

However, the municipality must ensure that it does not create more problems while solving others. For example, social problems can be created if development takes place on the waterfront that increases density without providing adequate additional services.

A growth in community spirit and a renewed sense of identity can be promoted by providing more space and opportunity for increased personal contacts and for special events, such as Canada Day celebrations. A related social benefit concerns safety, which can be addressed through waterfront improvement on several different levels. At the most basic level, waterfront development means more people on the waterfront and more "eyes on the street". People will feel more comfortable and be more attracted to a place which has been developed with human beings in mind. Safety from traffic, or from hazards such as a deteriorated shoreline, can also be achieved through improvements initiated as a result of a new development.

In Cambridge, the building of a levee and other flood protection measures has resulted in the creation of a popular riverfront walkway.

2.

PLANNING THE WATERFRONT

Many interests and many jurisdictions, combined with a unique location in the community, make developing a waterfront project or plan a complex undertaking. Few communities have problems tackling new community centres, and many have developed expertise in dealing with downtown revitalization. Waterfronts, however, are a different story.

Waterfront projects will likely require assessments of economic feasibility as well as specialized engineering and design work. They usually involve different levels of government, many different owners and, of course, the public should be consulted. As a result, the municipality should have an overall plan in place to guide its actions and will want to know, in advance, what practical planning tools are available.

The following chapter presents an overview of how the planning process might evolve. The actual process will depend upon the individual circumstances in each municipality. Later chapters go into greater detail concerning how to assess existing conditions, as well as the shoreline protection measures and design criteria which can be used when developing concept plans.

GETTING STARTED

Normally, the first question that arises is "where to start?". More often than not, the decision by a municipality to pursue waterfront development is precipitated by one of the following:

- a desire to promote economic development and tourism, which may be spearheaded by the economic development commission
- demands for improved recreational facilities, which may come from local community groups
- the need to respond to a private sector development proposal
- a heightened environmental awareness on the part of the general public
- an exodus of industry from the waterfront leaving vacant or derelict sites
- development activity on adjacent lands or changes of land use in adjacent areas.

Once the decision to proceed with waterfront development has been taken, the task of defining the area and determining the various jurisdictions can begin. This will assist council in developing the goals of the community in relation to the waterfront and in collecting basic information. Once that is done, the specific objectives for waterfront development can be identified and the process initiated to prepare the plan and an implementation programme.

THE WATERFRONT PLANNING PROCESS

GETTING STARTED

Determine Jurisdictions

▼

Define Project Area

▼

Initiate Public Involvement

▼

Develop Goals

▼

STUDYING THE AREA

Adopt Short Term Land Use Controls

▼

Identify Potential and Constraints

▼

Identify Users and Needs

▼

Develop Specific Objectives

▼

Prepare Alternative Concept Plans

▼

Select Final Concept Plan

▼

CARRYING OUT THE PLAN

Change Municipal Policies

▼

Amend Official Plan/Adopt Plan

▼

Establish Local Controls

▼

Project Development

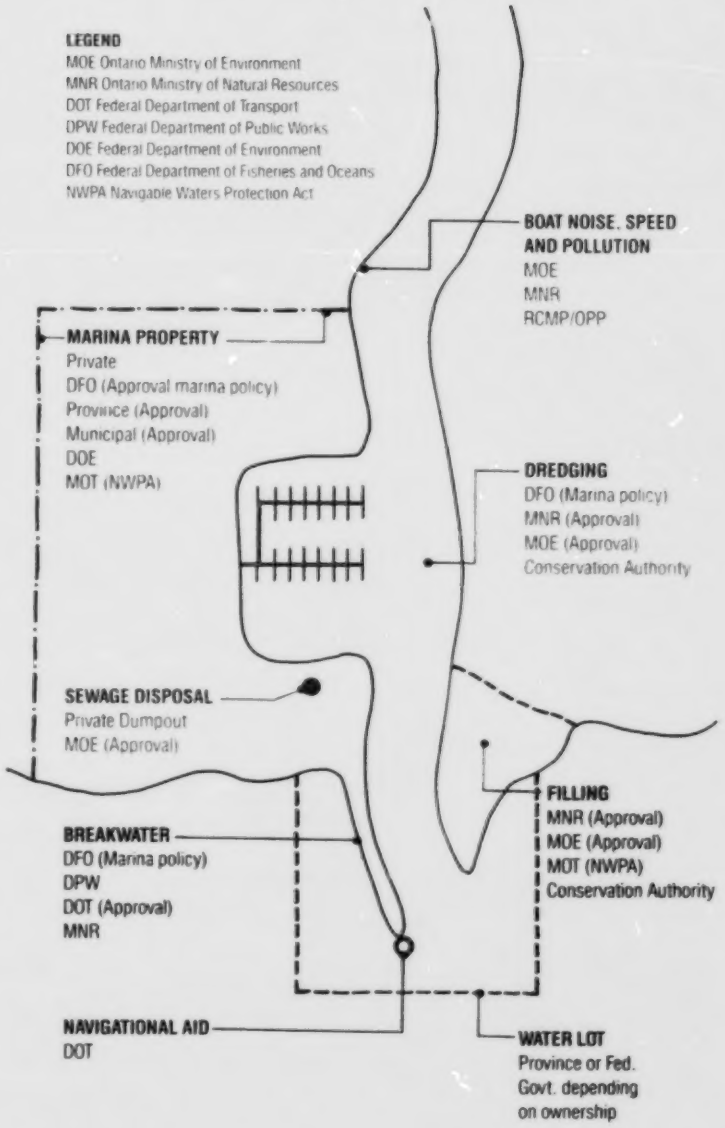
CLARIFYING THE JURISDICTIONS

Waterfronts are some of the most regulated of lands, largely because of their transport function and their location at the interface between land and water. The authority over the surface of navigable waters, which includes the majority of watercourses in Ontario, rests with the federal government. Authority over the use of the lake or river bed rests with the provincial Ministry of Natural Resources. The control of land uses on the shoreline rests with municipalities in organized areas and with various agencies in areas with no municipal organization.

Before placing any new installations on the bed of a waterway, written approval must be obtained from the municipality, if required by its by-laws, and from the local District Manager of the Ministry of Natural Resources. In addition, if the installation might interfere with navigation, written permission may be required from Transport Canada under the Navigable Waters Protection Act.

Some waterfront lands are devoted to uses that are regulated by federal not municipal authority, for example, port areas and railway lands. In these instances, if redevelopment of the lands is proposed, agreements will have to be worked out between the local and federal authorities concerning what the new uses will be and how they will be developed. The federal government and its regulated agencies are exempt from provincial legislation and municipal by-laws.

Approvals required for waterfront work



Government involvement in a typical marina development

Activity	Agency	Legislation	Who Needs to Apply	Description
* Construction on Crown Land	MNR	Public Lands Act	Municipalities and private landowners	- no structure or other matter may be situated on crown lands without approval
* Construction in Lakes and Rivers	MNR	Lakes and Rivers Improvement Act	Municipalities and private landowners	- permit is required for construction of any structure in or along any stream, river or lake - this includes protection works on the beach and in the water
Removing sand and gravel	MNR	The Beach Protection Act	Cons. Auths. municipalities and private landowners	- regulates the removal of sand and gravel from beaches and under the waters of any lake, river or stream - intended to prevent and minimize erosion of beach property
* Fill in Floodplain	Cons. Auth.	The Conservation Authorities Act	Municipalities and private landowners	- controls placement of fill in regulated floodplains
* Construction in Floodplain	Cons. Auth.	The Conservation Authorities Act	Municipalities and private landowners	- controls construction in regulated floodplains to prevent loss of life or property
* Construction in a Navigable Water	Transport Canada	Navigable Waters Protection Act	Province, Cons. Auth. municipalities, and private landowners	- controls construction in navigable waters - exemptions are usually obtained for protection works
Placement of materials in lakes and rivers	MOE	Water Resources Act	Cons. Auth. municipalities and private landowners	- no permit required prior to construction but MOE can stop work if they judge the work to adversely affect water quality
Environmental Assessment (Class EA)	MOE	Environmental Assessment Act	Cons. Auth., MNR and municipalities	- environmental screening of projects dealing with shore protection
Environmental Assessment (Individual EA)	MOE	Environmental Assessment Act	Cons. Auth., MNR and municipalities	- environmental impact assessment for projects of larger size (i.e. over $2 million in Dec. 1977 dollars) and of potential significant impact
Construction over any public shore, bay, harbour, river or water	Municipality	Municipal Act	Private Landowners	- approval for construction over public shores and water, if municipality passes by-law
Building Permit	Municipality	Municipal Act	Private Landowners	- required where retaining walls are constructed

* Normal approvals required by individual Landowners

Source: Ontario Ministry of Natural Resources. **How to Protect Your Shore Property**, March, 1986

MAJOR FEDERAL LEGISLATION WHICH MAY AFFECT WATERFRONT DEVELOPMENT

- Canada Fisheries Act
- Canada Shipping Act
- Department of Transport Act
- Fishing and Recreational Harbours Act
- Harbour Commissions Act
- Navigable Waters Protection Act
- Public Harbours and Ports Facilities Act
- St. Lawrence Seaway Authority Act

Federal legislation affecting waterfronts deals generally with the issue of transportation, including the establishment and management of ports, harbours and navigable waters.

MAJOR ONTARIO LEGISLATION WHICH MAY AFFECT WATERFRONT DEVELOPMENT

- Beach Protection Act
- Beds of Navigable Waters Act
- Conservation Authorities Act
- Environmental Assessment Act
- Environmental Protection Act
- Gasoline Handling Act
- Lakes and Rivers Improvement Act
- Municipal Act
- Ontario Water Resources Act
- Parks Assistance Act
- Planning Act, 1983
- Public Lands Act
- Shoreline Property Assistance Act

AREAS OF MUNICIPAL RESPONSIBILITY

Municipal planning programmes, instruments and approvals such as:

- official plans
- zoning by-laws
- interim control, temporary use, holding, and bonus by-laws
- site plan control
- community improvement
- land division.

Other local by-laws covering such things as:

- building inspection and building code enforcement
- property maintenance and occupancy standards.

There are many different Provincial Acts with potential relevance to waterfront issues and the most important are listed above. In general, they relate to the type of structures permitted, the location of proposed buildings or structures, construction and dredging techniques and funding for shoreline construction.

In areas where there are conservation authorities, permits may be required for certain on-shore development activities:

- the placement of fill, whether it originates on the property or has been brought from elsewhere
- the undertaking of new construction of any sort (i.e. house, garage, swimming pool, greenhouse, etc.)
- the renovation of or additions to existing buildings
- altering a watercourse in any way.

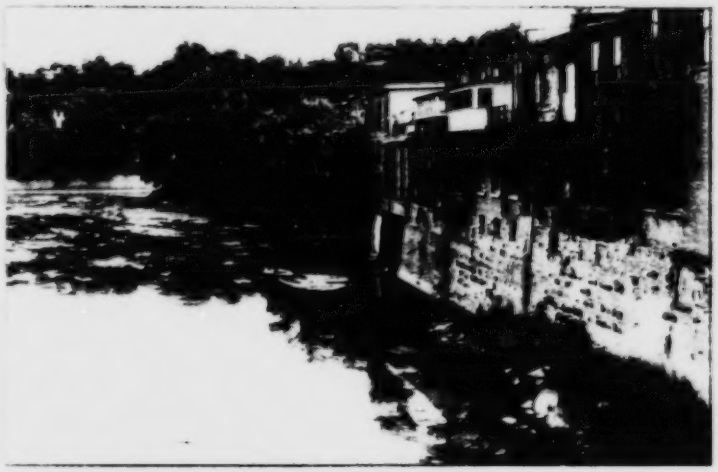
Where no conservation authority exists, similar approvals may be required from the Ministry of Natural Resources.

In addition, the development of plans for waterfront areas should be carried out in the context of applicable provincial policy statements issued under the Planning Act. For example, the flood plain planning policy statement is currently undergoing public review as required by the Act. However, since municipalities have a role to play in the implementation of policy statements, further details are given in the following section.[1]

The principal responsibilities of municipalities with respect to waterfront development are outlined above. One of the most significant tools is the official plan which can set out land use policies for the waterfront and direct overall municipal physical planning, as well as potential private sector development. The official plan may contain policies of council, as well as cover the type and mix of uses, the density of development and the amount of open space. Zoning by-laws and public works must conform to the policies set out in the plan. In addition to the conformity requirement, tools such as holding and bonus by-laws, site plan control or community improvement programmes require that official plan policies related to their use be adopted.

[1] For more information on policy statements, please contact the Office of Local Planning Policy, Ministry of Municipal Affairs, 13-777 Bay St., Toronto, Ont. M5G 2E5, (416) 585-6225.

FLOOD PLAIN POLICY



An important consideration in the development of waterfront areas is the susceptibility to flooding. Some areas of the province are identified as being within a flood plain and, hence, of high risk to flood damage. In such areas, flood plain policies and regulations should be included in the official plan and zoning by-law. Where such policies do not exist, the municipality, the Ministry of Natural Resources and the local conservation authority, if one exists, should be contacted. It is advisable that this consultation occur early in the planning process to avoid unnecessary delays.

While development is generally restricted in the flood plain area, some development may take place under certain circumstances, for example, where the flooding may be extremely shallow or slow flowing. In these situations, the municipality and the conservation authority have the option of incorporating the two zone approach in the municipality's official plan and zoning by-law. Part of the flood plain is identified as being developable with flood proofing to the regulatory flood (i.e. the flood fringe), while part is identified as being unable to be developed (i.e. the floodway) because of the potentially high risk. Application of this approach must be undertaken in consultation with the conservation authority and or the Ministry of Natural Resources.

In addition, there are some cases where a municipality has historically been located in the flood plain. If the economic viability of the community is dependent on further development (even in the flood risk areas) it may be possible to have these areas within the municipality identified as special policy areas in the official plan. In these cases limited development may be permitted to occur, but with flood protection measures being included. For example, in the City of Cambridge, which experienced several major floods, it was recognized that special measures had to be taken to avoid losses due to flooding while maintaining the economic viability of the existing community. As a result, some parts of the waterfront have been reserved for pedestrian walkways. Limited new construction is permitted, provided that the building designs incorporate special engineering measures to minimize the risk of damage due to flooding.

In the Town of Cobourg, three areas which are considered to be at risk to flooding fall under the special policy area designation in the official plan. This special designation overlays the land use designations for the waterfront lands, and special policies that address flood concerns apply in addition to those for the land use designation. These policies are implemented by incorporating provisions in the zoning by-law, such as, requiring that any openings to buildings be above the minimum level of flood protection.

The preparation of flood plain mapping requires extensive engineering studies; therefore, there should be sufficient justification for continuing to build in flood risk areas prior to any development proposal being considered.

DEFINING THE AREA

Once the various jurisdictions have been clarified the waterfront area in question should be clearly defined. It may be possible to narrow the planning area to a specific portion of the waterfront. However, the defined area should be large enough to include uses that would also be indirectly affected by waterfront development. For example, if the waterfront is close to the downtown, then a portion of the downtown area may be included to ensure that the activities of both areas can support and reinforce each other. This may require an understanding of pedestrian and vehicular links or a re-orientation of some of the commercial uses.

The shape and extent of the waterfront planning area will also vary depending on the type of waterbody. Along rivers, it will be important to include both banks and a length which reasonably permits planning continuity. On a bay, consideration should be given to including the complete bayfront. The extent of the area out into the water needs to be carefully considered in relation to the regulations of provincial and federal agencies.

In 1979, when the waterfront plan for Cobourg was being developed, the downtown was included as an integral part of the study area. The official plan for the Town of Cobourg now contains policies for visual corridors and pedestrian walkways to link the waterfront and downtown. By incorporating walkways to link the two areas and attempting to maintain visual corridors from the waterfront to key buildings in the town, it is hoped that the unique identity of the community will be enhanced.

Defining the area

INVOLVING THE PUBLIC

The development of waterfront areas is often a complex process involving a large number of interested individuals and organizations. The property owners in the area, as well as the community in general, and a whole array of interest groups (e.g. the Local Architectural Conservation Advisory Committee (LACAC), local yacht clubs, representatives of local industries) will need to be contacted and involved throughout the planning process. These groups may often have very different and conflicting views on how the waterfront should be developed. It will be the task of the municipality to resolve these conflicts, if they occur, and to develop policies that reflect the opinion of the majority of local residents, business people and property owners. However, these policies should be realistic in terms of what the municipality can afford to spend and the amount of private investment that is likely to be attracted to the area. This can best be achieved by involving members of the public in the process at every stage so that they understand the reasons for the decisions that are made.

If the council has established a planning advisory committee, this body, which regularly reviews planning policy and new land use proposals, may be used to facilitate public debate and coordinate community input early in the planning process. Otherwise, this function may be carried out by the local council with assistance from planning staff (if any). Some of the ways of obtaining public opinion are the use of community surveys, public meetings, workshops, walking tours of the area or the inclusion of members of local interest groups on steering committees.

ESTABLISHING MUNICIPAL GOALS

Once the boundaries of the waterfront planning area have been established, goals should be set which provide some focus for future studies. Although they may be revised following a more thorough analysis of the area, these goals should express the ultimate ambitions a community has for its waterfront. Members of the general public and special interest groups should have input at this stage.

Goals should be general in nature and provide long term direction for improving the area. They should also reflect the particular needs of the individual community. Some examples of possible waterfront development goals are:

- to create an accessible waterfront
- to provide new employment opportunities near or on the waterfront
- to increase the level of tourism
- to protect existing waterfront industry.

STUDYING THE AREA

One of the first steps in understanding the development potential of the area is to assess the conditions already existing on the waterfront in terms of the land use and ownership patterns, the physical setting and the present and potential user groups. The policies in the existing official plan will also have to be reviewed in terms of their applicability for possible waterfront redevelopment projects, and the zoning by-laws presently in place may need to be revised.

During this stage of the planning process, all the information that will be necessary to prepare alternative concept plans should be collected. Owing to the complexities of the physical environment in many waterfront locations, as well as the likelihood of multiple ownerships and jurisdictions, this could be a fairly extensive task. As a result, the municipality may consider hiring professional consultants to conduct some of the studies.

Many of the aspects that will need to be examined are presented in greater detail in Chapter 3, **Assessing the Waterfront**. Chapter 4, **Designing the Urban Waterfront**, contains general technical information and specific design solutions which will be needed when concept plans are being developed.

APPLYING INTERIM CONTROL AND TEMPORARY USE BY-LAWS

These land use control techniques[2] enable the municipality to regulate uses in a specified area, while planning studies are underway.

INTERIM CONTROL BY-LAWS

As soon as a study to review the land use policies in a given area is initiated by council, the municipality may pass an interim control by-law (Section 37, Planning Act). This is a short term land use control mechanism which allows a municipality to control development in the study area for a limited period of time while studies are underway. It is not intended to allow for a long term freeze and cannot prohibit uses that existed legally prior to the passing of the interim control by-law. It does, however, allow a municipality time to review the land use policies and not have future objectives compromised by development occurring that may not be consistent with future goals for the waterfront.

TEMPORARY USE BY-LAWS

In order to encourage the use of land in transition areas a municipality can allow specific temporary uses of land and buildings for renewable periods of up to 3 years (Section 38, Planning Act).

Uses allowed by a temporary use by-law do not attain legal non-conforming status, as would be the case with regular zoning by-laws. At the end of the time specified in the by-law the temporary use should be discontinued; therefore, it should not involve substantial investment that might result in hardship to the user when this occurs. It might be appropriate, therefore, to employ the temporary use provision to allow a vacant future commercial site to be used as a parking lot for two years, or to permit uses that relate to a special event, such as an exhibition. The temporary uses should still be compatible with the surrounding ones and should not be in conflict with the official plan.

IDENTIFYING POTENTIAL AND CONSTRAINTS

In order to identify the potential for waterfront redevelopment, along with the constraints, it is important to collect a basic foundation of information and to get to know the area. Every waterfront is unique, and this uniqueness is a large part of its potential.

Following improvements to the Town Dock, Midland was promoted as a major stopping point for recreational boaters.

The waterfront may have special physical characteristics because of its location on a particular waterbody, such as the Welland Canal. The shoreline or riverfront may be unique with high cliffs or sandy beaches. On the other hand, the waterfront may be important because of its regional location: a major industrial port like Thunder Bay or a recreational boating centre like Midland. The waterfront may also be close to or a part of downtown. Its buildings, piers and activities, particularly if the waterfront is home to a commercial fishery, may have a special attraction for tourists or for residents.

The unique or special features of each waterfront may not necessarily have been identified yet. In those cases, the preparation of a plan may provide the occasion for a community to assess its untapped potential, as well as improve its existing resources.

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[2] For more information see **Guideline 8 Zoning and Other Land Use Controls**, published by the Ministry of Municipal Affairs.

Many communities front on more than one waterway. Belleville, located on the Bay of Quinte, also has the Moira river running through the municipality.

Not every waterfront can become a tourist mecca and the potential for improvement or revitalization may lie in the enhancement of its existing opportunities, in order to cater better to the needs of local residents. For this reason, the principal functions of the waterfront should be evaluated at the outset, so that improvements can be chosen which are both practical and economically viable in the context of the particular community.

If the development of major tourist attractions or facilities is not appropriate, the community should not expect to draw on that market and should determine what the principal functions of the waterfront are or should be. For example:

- a port
- a local recreational area
- a transportation and service centre.

An assessment of potential would not be complete without an inventory of the physical characteristics of the waterfront. These include:

- land use mix
- unique features
- environmentally sensitive areas/ significant natural features
- engineering structures
- buildings, public and private
- boating and related facilities
- vacant/underutilized spaces
- parking
- roads and sidewalks
- recreational resources facilities
- utilities
- street furniture lighting signage.

An inventory of physical characteristics should consider problems with existing services and facilities (including whether they are in a poor state of repair) and their potential (how they can be improved). In general, the use of shoreline space, buildings and the water, as well as condition, location and design qualities should be evaluated. Input from landowners, boaters, other waterfront users, and provincial and federal agencies would be useful at this point. Any specialized studies related to environmental concerns, traffic patterns, or site conditions would also be carried out at this stage.

IDENTIFYING USERS AND NEEDS

An important part of this analysis stage is to identify for whom the waterfront is being planned and to involve the local residents, business and industry in the process of developing the overall plan. Potential users of the waterfront will vary depending on the goals of the community in relation to the waterfront area. In general, the users and their needs can be divided into two categories: the needs of local residents in terms of housing, jobs, shopping and recreation; the needs of tourists and other visitors in terms of accommodation (on land or water), shopping and other services. Not all communities can attract the tourist trade, however, and this should be recognized early in the planning process.

A market study, carried out either by the municipality or by consultants hired for the purpose, may be considered at this stage in the process. This will involve an analysis of:

- the existing waterfront facilities and attractions
- a profile of the present users (age, income, place of residence, frequency of use, amount of money spent, etc.)
- competing facilities or attractions
- the potential market that might be attracted to any planned new development.

Children enjoy a local swimming area.

If the municipality is considering new or expanded boating facilities (marinas or boat launch ramps), then a study of boat ownership and traffic, as well as the potential for growth in this area, should also be undertaken.

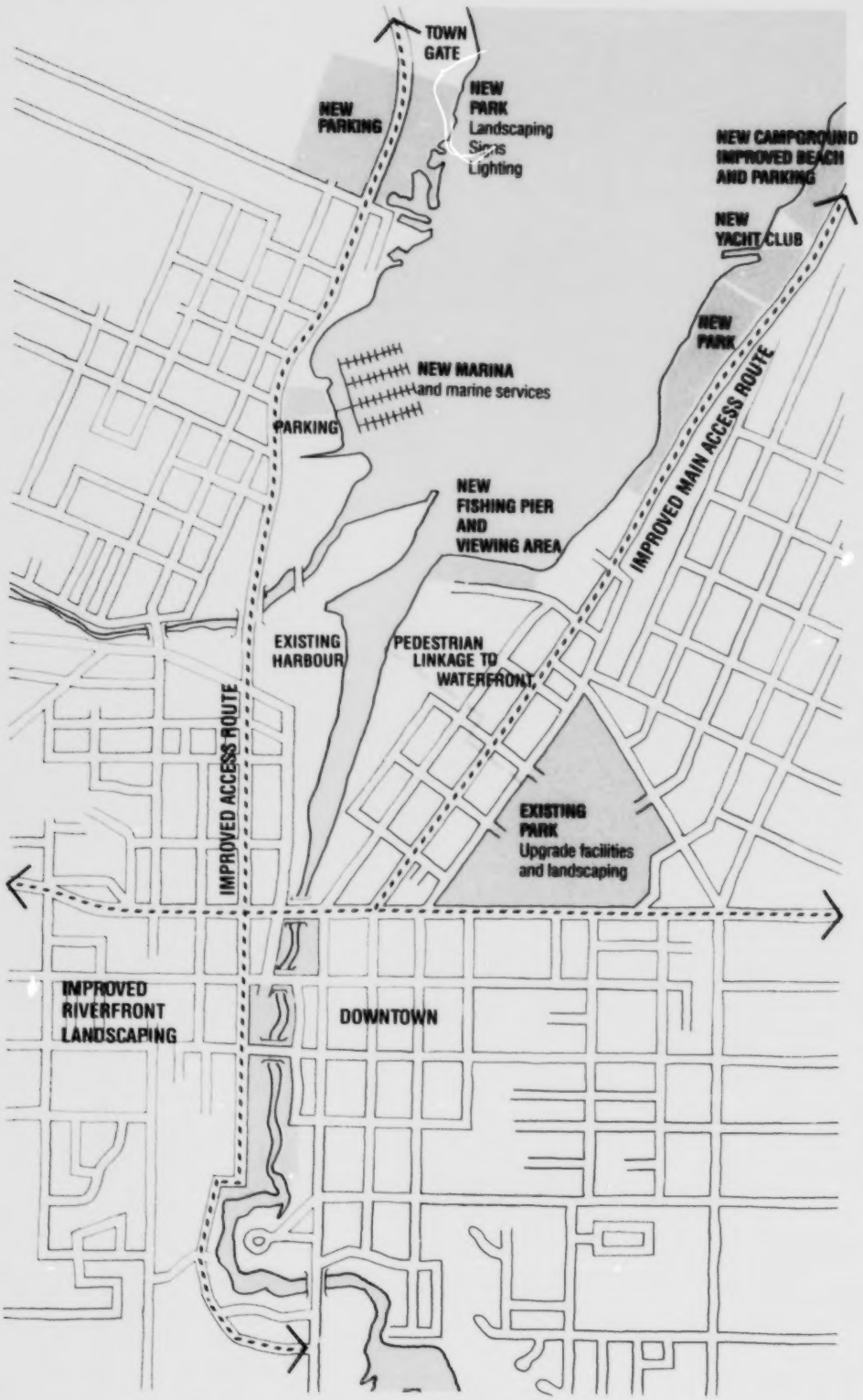
An open house held at this stage would serve the dual purpose of identifying the needs of interested individuals and groups, and keeping the public informed of the progress of the study.

DEVELOPING SPECIFIC OBJECTIVES

Once an assessment of potential has been completed, objectives can be developed to implement the general goals stated at the outset of the planning process. These should be specific in order to encourage initiatives from the private sector and provide guidelines for the consideration of actual development proposals. Examples of possible objectives are:

- to develop transient marina facilities
- to encourage the development of commercial uses on the waterfront
- to create a walkway linking downtown and the public dock.

A concept plan



PREPARING CONCEPT PLANS

A plan for improvement to a waterfront area will involve a number of different components. It will illustrate the specific changes proposed, where they will be located, how they will relate to each other, and the time frame needed for their implementation.

Once a range of possible improvements has been developed, alternative concept plans may be prepared that incorporate the proposed work items. These would show how everything fits together and visually provide a way of testing their feasibility. Each alternative plan may include an indication of possible funding sources and municipal priorities in terms of budgeting for the necessary community improvements. A cost/benefit analysis of each of the alternative plans may be undertaken at this stage.

Detail is not important at this point and efforts should be concentrated on preparing several overall schemes for the area, rather than working out the details of a particular improvement. The number of alternative concept plans should be kept small. At this stage of the process it is important that the alternative proposals be presented to the public. It might be appropriate for this to be done at an open house.

THE FINAL PLAN

The alternative plans should be evaluated and the most suitable one or a composite, made up of elements from different plans, should be selected. This decision will be made by council after taking into account input from the public.

The following criteria should be considered an important part of plan selection:

- *Suitability*: How well does the plan conform to the goals and objectives established at the outset of the process? Will it solve some of the community's problems and will it utilize available potential? Are the goals still appropriate? Have the concerns of interested agencies and the public been resolved?
- *Cost*: How much will the improvements cost? How will they be funded? Will sufficient funds be available when required?
- *Feasibility*: Can the improvements all be carried out within the stipulated time frame? Are there any major impediments to the undertaking (e.g. property ownership)?

Once the most appropriate plan has been selected, a final concept plan can be prepared. The final plan would include detailed working drawings for actual improvements such as a breakwater, landfill or a marina.

CARRYING OUT THE PLANS

At this stage the municipality will need to consider how it intends to implement the concept plan that has been developed.

- The first step should be to decide whether the goals and policies of the existing official plan reflect the direction that is being taken in the waterfront development project. If not, then it may be necessary to formally amend the official plan document.
- The concept plan itself may be adopted as an amendment to the official plan, possibly as a secondary plan.
- Changes in the existing zoning by-laws may be required as a result of the new waterfront plans and policies.
- New by-laws (e.g. holding, bonus) may need to be adopted to manage and facilitate the implementation of the plan.

MUNICIPAL POLICY

Once the final waterfront concept plan has been agreed to, the municipality should consider policies to guide development or redevelopment. It may be necessary at this stage to revise the goals that were articulated at the beginning of the study process and to make amendments to the official plan with respect to type and mix of land use, densities and open space requirements.

The Town of Prescott and the City of Orillia have taken different approaches in developing policies and land use designations for their waterfront areas. Prescott has developed in its official plan the concept of three district "focal points" for the waterfront area: these are a local-oriented area, a central commercial core area, and a tourist area. In this way, Prescott recognizes three distinct areas of opportunity and has incorporated policies in the official plan that encourage different types of uses in each of the three districts.

Orillia took a different approach and developed a waterfront commercial designation that allows a wide range and mix of uses, such as, hotels, motels, commercial recreation facilities, offices, marinas, residential, restaurants, taverns, local retail and tourism-related retail. By including a wide range of permitted uses in the waterfront commercial designation, the municipality can accommodate a whole range of uses without the necessity of an official plan amendment.

ZONING BY-LAWS

The zoning by-law is the most important tool that municipalities have for regulating actual physical development. It can be used to control the height, bulk, location, size and use of new buildings. Unlike the official plan, the zoning by-law contains very specific and legally enforceable regulations.[3]

Although these regulations prescribe the specific uses, the municipality may consider creating a mixed use zone which can allow for the mixing of complementary uses. This would enable it to provide a more flexible approach to land use control while increasing the opportunity for integrating waterfront uses.

OTHER LAND USE RELATED POWERS

A number of additional land use related provisions in the Planning Act may be used in waterfront development, providing that policies which relate to their use are incorporated into the official plan.

COMMUNITY IMPROVEMENT

Council may choose to designate all or part of the waterfront as a community improvement project area (Section 28, Planning Act). This allows the municipality to develop a plan for the re-use, redevelopment or improvement of existing areas and sets out a convenient process to be followed.[4]

The powers under this section would be particularly useful in waterfront areas and a community improvement plan, once developed, could become the final concept plan for the area. The municipality can, for example, acquire and hold land in the project area where a variety of owners may be one of the barriers to effective planning. In addition to land acquisition powers, the municipality can also clear, grade and service the land in accordance with the plan. The involvement of both public and private interests is required and the municipality is able to make loans and grants to owners who wish to improve their property in accordance with the plan.

In the City of Port Colborne, a commercial area fronting onto the Welland Canal was rehabilitated using the provisions of Section 28. In the same way, the City of Brockville was able to extend public services and provide improved park and recreation facilities in a waterfront residential area.

Port Colborne.

[3] The process a municipality must follow in adopting or amending a zoning bylaw is set out in **Guideline 8 Zoning and Other Land Use Controls**, published by the Ministry of Municipal Affairs.

[4] For more information see **Guideline 4 Community Improvement**, published by the Ministry of Municipal Affairs.

PROPERTY MAINTENANCE AND OCCUPANCY STANDARDS

The municipality may also wish to pass a by-law establishing standards for the maintenance and occupancy of properties within the area (Section 31, Planning Act). This by-law gives the municipality the power to ensure that all properties are repaired and maintained to acceptable standards. This is a useful tool for ensuring that an area, once improved, is not adversely affected by the poor upkeep of one or more properties.

HOLDING BY-LAWS

In some cases the municipality may wish to control the staging of waterfront development (Section 35, Planning Act). The holding provision enables a municipality to identify, in a zoning by-law, the uses that are ultimately intended for specific lands, but to delay their actual development until some later time when identified conditions are met.

For example, the official plan for Nipigon specifies that the waterfront lands on which the most intense development is envisioned will be placed in a Waterfront Commercial Holding Zone. In this way certain servicing considerations can be addressed before building is allowed to commence.

This provision is intended to be applied in situations where it is known precisely what uses will be developed in the zoned area. It is indicated by the use of an "H" or "h" symbol in conjunction with a land use category in the by-law. In situations where the ultimate use is unclear or unknown, council may wish to apply traditional zoning methods, such as the use of a non-development zone.

BONUS BY-LAWS

Municipalities may award increases in height and density of development, in addition to that provided for in the zoning by-law, in exchange for the proponent providing specific services or facilities which have been identified by the municipality in the zoning by-law (Section 36, Planning Act). This provision is intended to allow the municipality to award incentives to encourage private sector involvement in the achievement of stated public objectives, such as, the provision of assisted housing, the preservation of buildings with historical or architectural value, or the provision of additional open space. It may be beneficial to use these provisions in waterfront areas, especially in cases where objectives in relation to heritage conservation and the provision of public open space can be enhanced through developer contributions.

SITE PLAN CONTROL

Council may wish to exercise site plan control to refine the development details of specific sites (Section 40, Planning Act). This is done by requiring council's approval of plans and drawings showing the location of all buildings and structures, as well as some facilities and works associated with specific developments. For example, through site plan control the following can be controlled:

- vehicular and pedestrian access
- loading and parking facilities
- landscaping
- lighting of the site and buildings.

Some aspects of building design are specifically excluded from site plan control since the legislation is not intended to allow detailed architectural control.

CAR PARKING

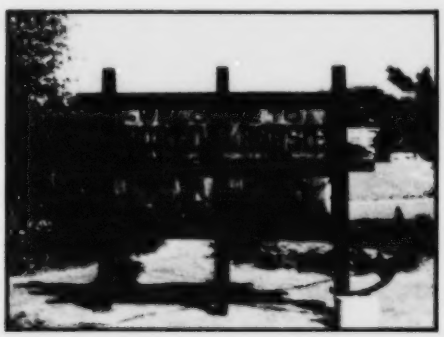
The municipality has wide powers over the provision of car parking. It can:

- impose off-street parking requirements for new developments through the zoning by-law (Section 34, Planning Act);
- receive "cash-in-lieu" payments from developers (Section 39, Planning Act);
- provide parking lots (Section 9 (208), Municipal Act);
- establish a parking authority to operate them, (Section 9 (207-234), Municipal Act).

SIGN CONTROL

The municipal council can enact a by-law regulating the size, number, location and type of new signs and other advertising features within a commercial area. They are also empowered to prohibit signs overhanging the sidewalk (Section 210, Municipal Act).

Controlling signage can assist in creating a more distinct and cohesive image for a waterfront commercial area. A more standardized system of display consistent with the particular theme being developed for the waterfront can be introduced.



HERITAGE CONSERVATION

The municipality can designate buildings as historically and or architecturally significant (Part IV, Ontario Heritage Act). The designation gives the municipality the power to refuse a permit for alterations or demolition for a specified period of time. The municipality may also acquire or expropriate the buildings, make grants for their alteration, acquire easements or enter into agreements for their upkeep.

Where a number of historic buildings effectively work together to create an identifiable area it can be designated as a "heritage conservation district". This designation gives the municipality many of these same powers over all of the buildings in the district regardless of their individual heritage.

Waterfronts are often historically significant areas, containing buildings dating back to a community's beginnings. Prescott, for example, has renovated one of its original waterfront buildings for use as a museum with an emphasis on the waterway connections.

PROJECT DEVELOPMENT

As most urban waterfronts are improved over a long period of time, one important consideration in initiating waterfront development is to identify a visible "starter project". If such an initial starter project can be completed and made available for use, it will help generate public support and highlight the potential for further development.

An example of such a project might be improvements to the harbour area, such as a boardwalk. Although improvements may involve large capital expenditures, they pave the way for other developments and associated commercial facilities.

An important aspect of developing a visible starter project is finding ways to promote it and to encourage its use. This is often possible by programming events and activities around new developments which will draw users. Without conscious promotion programming, a new project is not likely to stand on its own. Who will be the participants? What facilities will be required? How can users be attracted? What type of municipal support will be needed? These are all important questions to ask when the new project is being planned.

PROJECT DEVELOPMENT

PUBLIC ACTIONS

Prepare Capital Works Programme

▼

Prepare Capital Budget

▼

Identify Operation and Maintenance Responsibilities

▼

Organize Programming and Events

▼

PRIVATE ACTIONS

Prepare Development Proposals

CREATING A DESTINATION

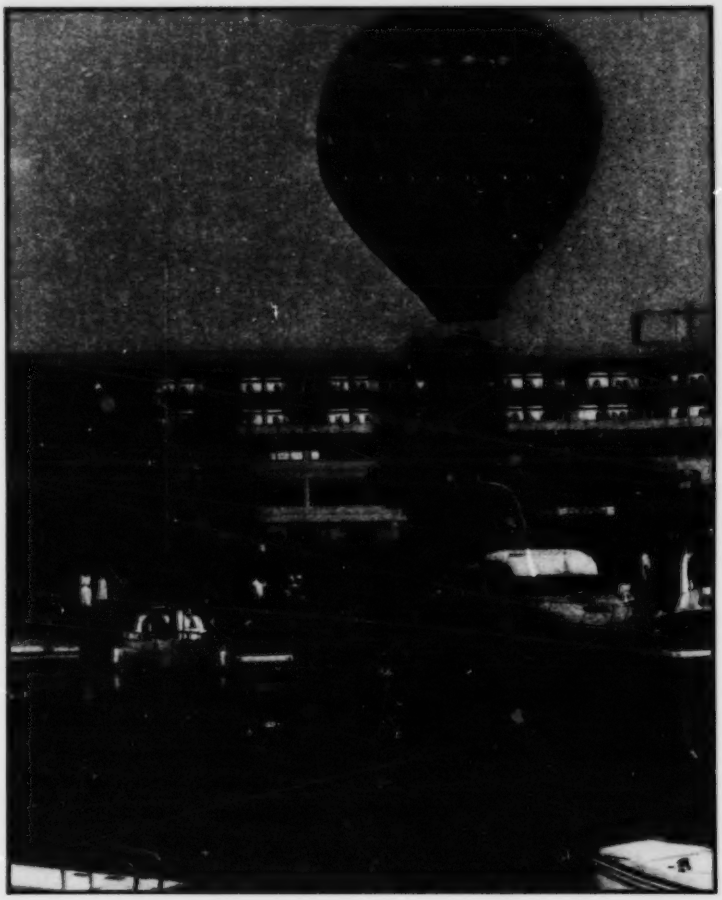
Many of the existing waterfront projects in Ontario involve single initiatives which are somewhat unrelated, for example, an isolated restaurant, a marina with no supporting facilities or a commercial complex located well away from the downtown. Each of these individual projects must face the problem of trying to change consumer travel patterns. However, it is unlikely that they will generate a large enough market by themselves to do this and, as a result, may never become financially viable. This problem is even greater in the winter season when the number of tourists is generally reduced.

A certain amount of development is essential in order to make a visual impact, create a readily recognizable focal point, and attract and retain users. The urban waterfront of the City of Kingston is an example of this concept. Large hotels, parks, restaurants, tourist attractions, marinas and retail uses are located in close enough proximity to become a major attraction.

Similarly, commercial, recreational and residential uses along the Belleville waterfront are beginning to develop as a community focal point.

A second consideration is the importance of creating an impact in the initial phases of the project. In order to begin the process of creating a major waterfront attraction, it may be necessary to erect temporary structures, such as tents or plywood display booths for merchants, which will create a destination at minimal expense. In this way, an impact will be made during the initial phase of the development. The public will begin to acquire the habit of using the waterfront and momentum will be created which can continue through all stages of the development.

It should be recognized that urban waterfront revitalization is a process that may take many years to complete. Each stage of the development will demonstrate to the public and potential investors that a commitment to change has been made and is creating the desired impact.

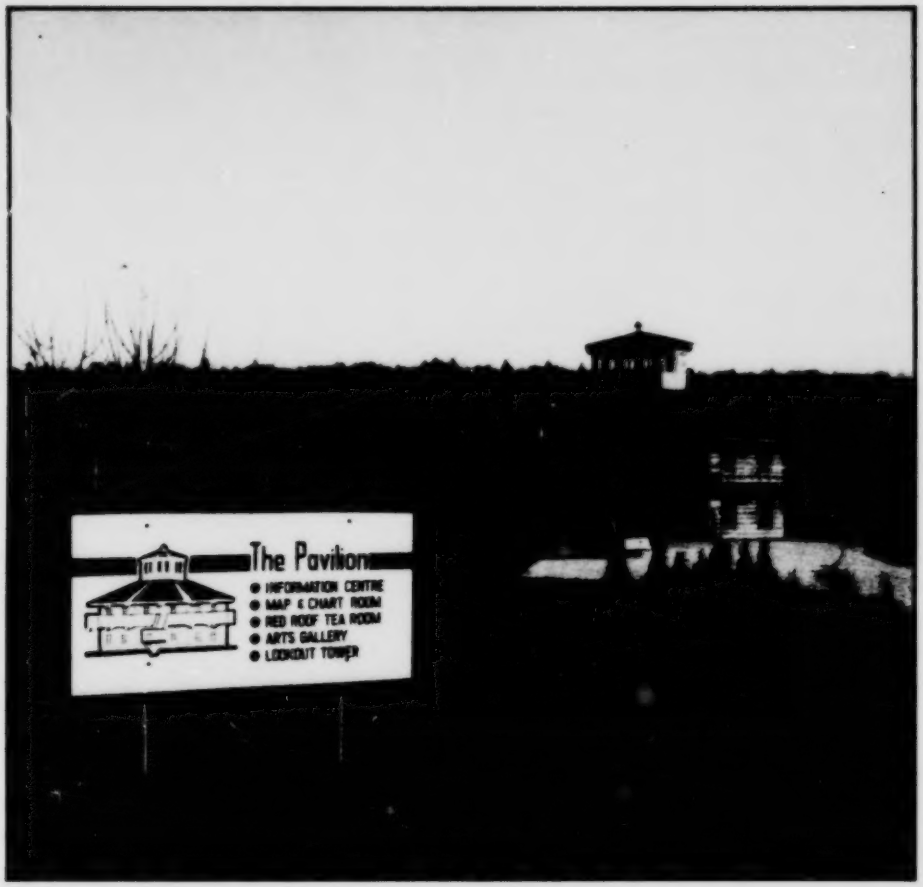


The Belleville waterfront is becoming a major community focal point.

DEVELOPMENT INITIATIVES: PUBLIC/PRIVATE ROLES

Both private and public sectors may be involved with urban waterfront development. Public sector investment is often seen as a catalyst which leads to further private investment and every attempt should be made to use public components to stimulate the private sector. There are a variety of different ways in which cooperation between the public and private sectors can be achieved.

In Kenora, a waterfront plaza, parking and additional boat mooring facilities were developed on the lake shoreline adjacent to the downtown. This was a public project and a waterfront planning committee, composed of citizens and members of council, was created to work with consultants on plan preparation.



The tourist information pavilion in Gore Bay is situated on the waterfront.

The expectation was that enhancement of the waterfront area would stimulate private investment and provide much needed parking to assist downtown businesses. Financing for the project was received from the Ministry of Northern Development and Mines, the former BILD programme[5] and Small Craft Harbours Branch.

The City of Brantford was able to create a linear pathway along the entire waterfront, as well as construct park amenities, carry out tree planting, develop fitness and bike trails and carry out a general waterfront upgrading and clean up. The City and the conservation authority own much of the waterfront land in Brantford and in 1981 a steering committee was set up to investigate waterfront planning. Fund raising events were organized and the City agreed to provide matching funds up to a total of $300,000.

Attracting private sector participation in a public project is not an easy task, however, and will take considerable time and effort. It must be demonstrated that the potential benefits are greater than the investment risks. While it is very attractive to a municipality to have private sector commitments at the beginning of a project, this is not always realistic to expect.

[5] Board of Industrial Leadership and Development

OPERATION AND MAINTENANCE

To ensure successful waterfront development there should be a program for the operation and maintenance of the public components of the new facilities. Many of the tasks will be typical parks maintenance activities but new facilities, such as marinas, may require special skills and staff.

A marina manager is usually employed to oversee operations, and gas and dock attendants will also be required if fuel is to be available. At the Midland marina, students are hired to greet boaters personally and to assist them with docking.

Security is a very important consideration for marinas. Requirements and solutions will vary according to the specific locations and facilities developed. Seasonal and overnight docking areas may require 24-hour security, while some day-use areas may be totally unsupervised. There are many alternatives in use, including controlled access points to docking areas, entrance gates with key or pass card systems, security patrols provided by private companies, and on-site seasonal accommodation for a marina employee. While security is an important consideration, the solutions should not be intrusive and should not detract from the overall quality of the public spaces.

PROGRAMMING AND EVENTS

Programming is the planning and organizing of the use of the facilities and spaces. The success of a waterfront redevelopment project which aims to draw the public often hinges upon how successful the organizers have been in programming the space and promoting events. For this reason, programming should take place early in the waterfront planning process and not as an afterthought.

Even in Toronto, where the waterfront can draw on 2.7 million inhabitants, the programming of Harbourfront's events and attractions has done much to develop its reputation. From antique markets to children's performances, this waterfront offers a wide range of activities which make the area attractive to a great many people.

The Henley Regatta in St. Catharines is a popular summer event.

Waterfront activities and programming are not limited to the larger communities in Ontario. In fact, many Ontario communities host some type of event on the waterfront. Often the event is a local affair, but in other instances it will have a much wider market. These include Canada Day celebrations, picnics and boating competitions, fishing derbies and theatre productions, sky-diving shows, flea markets, historical pageants, wind surfing events and dance contests. Most waterfront activities take place during the

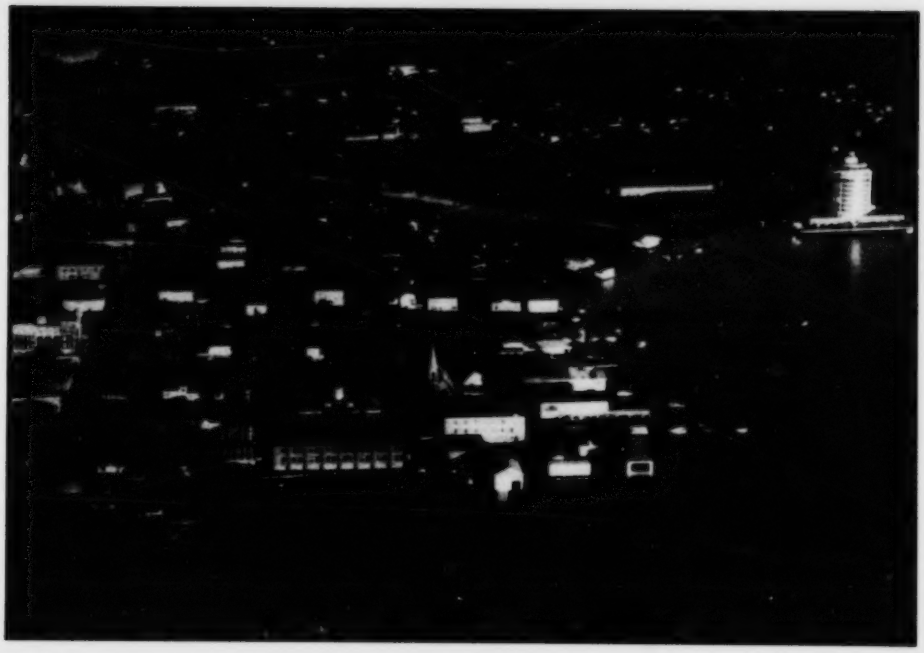
summer; however, programming for winter activities, such as Ottawa's "Winterlude", ensures year-round usage of the waterfront, as well as providing a tourist attraction. This very popular festival features over 90 activities, including the Great Canadian Bed Race, snow sculptures, and harness racing and skating on the Rideau Canal.

When programming for facilities and events, regional coordination will prevent the duplication of nearby resources and may stimulate the region's drawing power at off-peak times. The combining of complementary resources and the coordinating of activities may help many smaller municipalities to benefit from the drawing power of the immediate region. If this kind of approach to waterfront promotion is adopted by a number of municipalities, the benefit to a region as well as the individual municipalities could be considerable.

The Rideau Canal in Ottawa is popular in both winter and summer.

3.

ASSESSING THE WATERFRONT

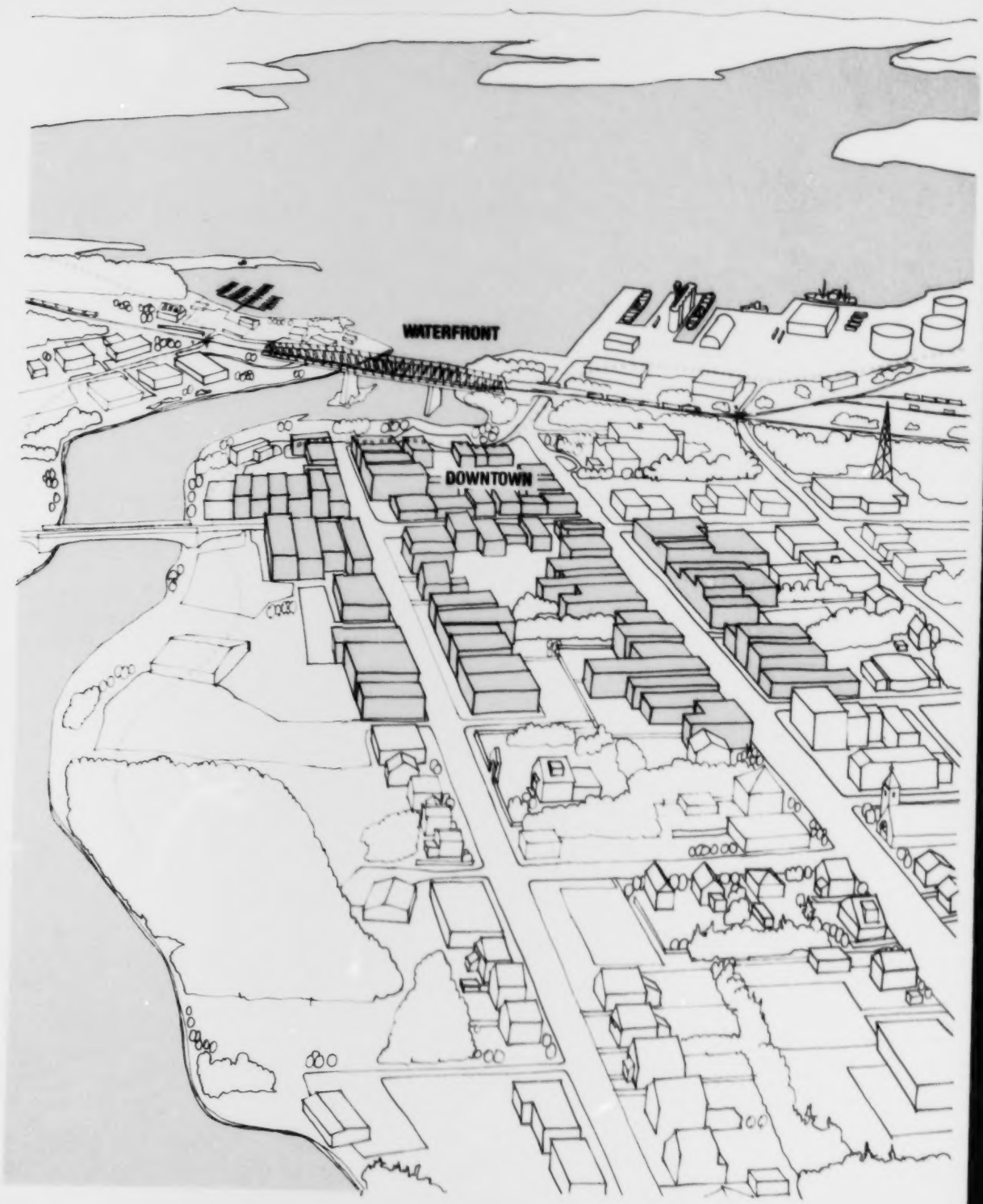


In order to prepare a viable waterfront development plan it is essential to study the existing conditions. Without an accurate knowledge of what is already there, it is impossible to plan for the future. This study should concern itself with both the existing built environment and the specific site conditions. The potential of the waterfront for development or redevelopment, will be determined by the opportunities and constraints identified during this analysis. Once these are determined, then market studies can be carried out, alternative concept plans developed, cost/benefit analyses undertaken, and financing options pursued.

LAND USE ISSUES

An inventory of existing land uses and an assessment of their permanence is important for long-range planning on the waterfront. This information can assist in the definition of the study area, the establishment of goals and the analysis of potential and constraints.

The Urban context



URBAN CONTEXT

In order to put a particular waterfront area in context, it is useful to understand its history as well as the trends that have affected its development. In the first part of this century waterfront areas were primarily industrial with access by boat, rail and road. These industrial areas have often grown and today may constitute a major component of the local and/or the regional economy.

However, many industrial uses are no longer dependent on rail or water access and have moved to new industrial parks with better road access. As a result, many waterfronts are characterized by vacant buildings and abandoned land and equipment. These vacant and under-used lands, close to the downtown, are a community resource that is often completely ignored.

The unused industrial buildings may have potential for renovation and re-use. Such buildings can often become a waterfront focal point and a theme for the development. By capitalizing on these existing buildings and using them to create a unique environment, a municipality can ensure that its waterfront is not a carbon copy of one in a neighbouring community.

It should be remembered, also, that existing land uses, even if they are noxious or unsightly, have the legal right to continue. A change of zoning will not automatically make an unwanted use an illegal use.

RELATIONSHIP TO THE CBD

The surrounding and adjacent land uses will also play a determining role in developing plans for the waterfront. In particular, the relationship of the waterbody to the central business district (CBD) will influence goals for the area. Many Ontario waterfronts are cut off from the CBD by major roads or railway lines, as is the case in North Bay and Pembroke. The main goal of a waterfront plan may be to overcome these barriers. In other cases the downtown may have turned its back on the water. In Kenora, for example, new lakefront developments physically connect the CBD with Lake-of-the-Woods, by means of pedestrian linkages and a lookout.

A coordinated effort in redeveloping the CBD and waterfront can assist in linking the two areas as important focal points of the municipality. This link has the potential to attract not only residents but also non-residents who might otherwise travel to the CBD but not to the waterfront. Secondly, it can capitalize on new tourism-based activities and ventures.

In Welland, the lift bridge provides a visual focal point linking the main street and the canal.

Relationship to the CBD

OWNERSHIP

Fragmentation of land ownership may make waterfront projects difficult to implement, because agreement must come from many sources. Piecemeal land use changes and land divisions have often produced a disorganized arrangement with potentially incompatible land uses on many of Ontario's waterfronts. Although it is possible to reach agreement between owners to develop municipally sponsored projects, for example the bicycle path along the Toronto waterfront, these negotiations can take a long time. In this instance, they took more than a year.

Ownership of the waterfront lands and waterlots is going to affect development in terms of the ability to change land uses, the development rights and the ability to create land assemblies.

As was previously mentioned, a change of zoning will not automatically eliminate an incompatible land use. The plan process should recognize these existing uses even if they are not consistent with the proposed new development.

Assembling land for a waterfront project, either public or private, is a key step in the development process. The parcels of land should accommodate the proposed development and allow for any future expansion. Some municipalities may wish to create a public land bank in order to better control the development that takes place. If the waterfront has been designated as a community improvement project area then the municipality can acquire land in the area. This land can then be either leased or sold to private interests, or developed by the municipality. However, a lack of clarity concerning title to waterfront lands and waterlots may be an obstacle to overcome during the development process.

Determination of waterfront land ownership is often complicated. On shore, adjacent to the water, there may be a 20 metre wide strip of land which may be either a road allowance or a Crown shoreline reserve. Road allowances, identified as such in the original surveys of townships, exist whether or not there are actually roads on them. They

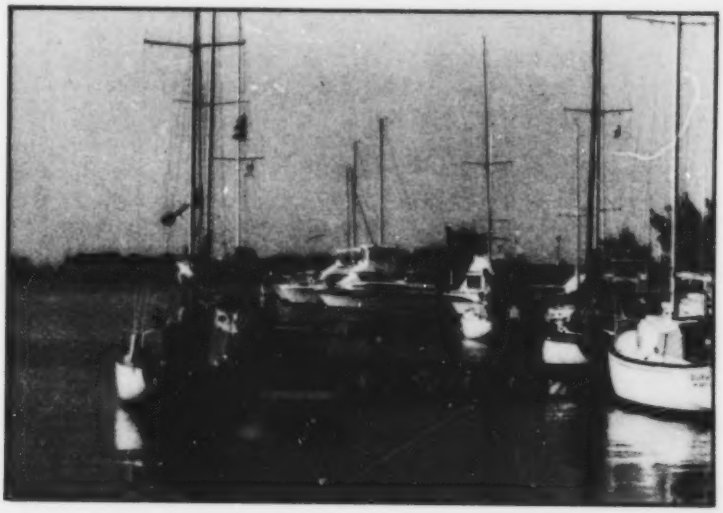
may already have been purchased by the shore property owner, be owned by the municipality or by the Crown. Crown shoreline reserves commonly exist where there is no original road allowance.

Ownership of waterlots (the land under a navigable waterbody which is determined by an extension of the property lines out into the water) will also affect waterfront development. In some instances the shore property owner has title to this land. In general, unless the Crown patent (Deed) specifically confers ownership of the lands under the water, the beds of navigable waters are owned by the Crown as represented by the Ministry of Natural Resources. As the ownership is not always clear or continuous along a shore-line, before any development (e.g. a breakwater) is undertaken, a search of the land title records should be made to clarify the situation. Use of these lands can sometimes be obtained through leasing arrangements with the owners.

In addition, large areas of waterfront land are owned by the railway companies. Some of the tracks are under-used or disused and may be removed or relocated. Others, however, are in regular use and may be a major issue as far as public access or redevelopment is concerned. In North Bay, it was determined that the railway lines would not be relocated in the foreseeable future. The concept plan which was developed took this into account.

WATER-DEPENDENCY

Since waterfront land is limited, most municipalities will want to reserve this prime space for those uses dependent on a waterfront location or those most enhanced by this location. Certain land uses cannot exist anywhere but on the waterfront. Marinas, boat rentals and tour boat operations are recreational examples.



Certain businesses, such as marinas and boat rentals, are water dependent.

Industrial uses and some utilities, such as water treatment plants, pulp and paper mills and fish processing plants, may also need to be located on or near water. The municipality will have to consider carefully whether or not new industrial uses belong in this area or if they can be located away from the water. As far as existing uses are concerned, the pros and cons, as well as the practicality of relocation, should be considered. As these activities are often essential to the economic well-being of the community, relocation may be impractical.

Some uses may be categorized as waterfront related, an example being a marine supplier. A small distance from the water would not deter the functioning of these activities. Restaurants and tourist commercial uses belong to another category that is waterfront enhanced. The waterfront location is their main drawing power and often these uses are major contributors to the economic viability and popularity of the waterfront.

Planners may also be confronted with a working waterfront: a major port as in Sarnia, a fishery as in Port Dover or a transportation centre as in Kenora. The challenge in these cases is to prepare a plan which recognizes and supports these uses. Housing or restaurants may be inappropriate if they prevent existing users from operating efficiently.

Finally, an understanding and prioriza-tion of land uses in terms of a waterfront location can be carried out before or as part of plan preparation. The three logical categories to consider and to give priority to would be uses which are:

- water-dependent (commercial fishing, marinas)
- water-related (marine supplies)
- water-enhanced (restaurants, community centres).

Some activities must be located directly on the waterfront, others may be some distance away.

The following chart sets out many of the factors that should be considered by planners when analyzing uses which currently exist on the waterfront.

CONSIDERATIONS RELATED TO EXISTING LAND USES

RESIDENTIAL

General

- age, condition, type, tenure
- availability of services and facilities (schools, day care, public transit)
- need for security and privacy
- the retention/ensurance of public access to the waterfront
- built-in market for other uses
- share parking with commercial uses
- potential conflict with recreational users over parking space

Single family detached

- limits public access to shoreline
- ownership of water rights should be examined before any work is carried out for shoreline protection

Multi-family

- public access more easily achieved
- can combine with commercial uses more readily

COMMERCIAL

General

- age, condition, type of business, floor area, rent
- profitability, economic impact (jobs, taxes)
- traffic patterns, access, deliveries
- permits year-round public use of the waterfront
- assess for continuing viability and appropriateness to future plans
- may provide goods and services for boaters

Offices
- provides year-round daytime clientele for services and retail
- best located in a mixed use area

Retail/Restaurants/Fitness Clubs
- best located in a mixed use area

Hotels
- can benefit from views and location
- provides a 24 hour, year-round market
- best located in a mixed use area
- essential for tourism promotion

INDUSTRIAL

General
- number, type, economic viability
- must be carefully assessed/may be crucial to the local economy (taxes, jobs)
- may be dependent on a waterfront location e.g. docks necessary for delivery and export of goods and raw materials
- may be basis for the waterfront's attraction to visitors (e.g. fishing fleet)
- if not water dependent, could be susceptible to relocation
- can impede or prevent public access
- may limit recreational boating opportunities
- may have major negative impact on land, air and water quality
- could have access problems and little space for expansion

Noxious Industry
- adjacent development should be undertaken with care
- prevailing winds and currents should be considered when locating adjacent uses
- adjacent uses will have to be buffered to screen from visual or noise pollution

INSTITUTIONAL

General
- provides a built-in clientele for other uses
- ensures public access to the water's edge
- may represent site of community's beginnings

Museums/Art Galleries/Interpretation Centres
- can serve as a focal point for redevelopment
- often oldest and possibly most scenic part of the community, therefore, an appropriate location for these attractions
- can be located in old public buildings

Utilities
- facilities such as water and sewage treatment plants must be located near the water
- existing plants must be considered when siting new uses, such as beaches or playgrounds
- buffering will be necessary

RECREATIONAL

General
- most widely accepted waterfront use
- generally, does not interfere with environmental and/or flood plain requirements
- can serve as a natural buffer area
- not every community can have a recreational waterfront/other uses may be more important to the local economy
- often does not have drawing power in winter
- may require extensive management and operating costs
- effective programming is essential for success

Active playing fields
- should exist as a complement to covered facilities, such as a community centre
- may not be appropriate for a waterfront location

Passive open space
- appropriate as a complement to other facilities

Marinas/boat launch ramps
- integration with complementary services and retail
- design of public access and circulation areas
- transient marinas require parking only for visitors and deliveries
- boat launch ramps and permanent marinas require parking for boat trailers and cars
- permanent marinas also require areas for winter storage
- security is an important factor

Beaches
- assess location in relation to other uses (industrial effluents, sewer outfalls)
- should occur with other recreational support facilities, such as change rooms, washrooms, parking/public transit etc.

EXISTING SERVICES

As part of the assessment of waterfront facilities, a complete inventory of municipal hard services for the development area should be made. This should include location, pipe sizes and condition, existing capacities as well as any planned improvements.

It is likely that any extensive waterfront improvements will require some upgrading of services. If this is the case, consideration should be given to the method of paying for the improvements. This could be through public expenditure, a private developer or a shared public/private agreement. If the costs are to be borne by the municipality, they should be considered in the context of the 5-year capital works budget.

The basic elements of the analysis should include the following:

Storm Drainage: Since waterfront developments are adjacent to significant waterbodies, storm drainage will usually not be a problem. However, stormwater outfalls may cause problems (e.g. with siltation) and the existing storm drainage pattern in the vicinity of the proposed development should be determined. This will not only ascertain if a problem already exists but also ensure that the new development does not interfere with the established pattern. The basic considerations are:
- nature of existing storm drainage in the development area (piped or overland)
- method of draining site
- existing stormwater outfalls
- stormwater quality concerns
- municipal stormwater management practices (if any).

Sanitary System: Any significant waterfront development could have an impact on existing sanitary sewer systems and pollution control plants. Basic information should be gathered on existing and

proposed sanitary systems and plants and the possible impact of new development. The basic elements of the analysis should include:

- type of local sanitary system (piped, septic, etc.)
- capacity of the existing system and any planned improvements
- capacity of any existing pollution control plants
- sewage loading of the proposed development
- method of handling sewage from the proposed development (municipal system, private).

Roads and Traffic: It is likely that any new waterfront development will have its greatest overall impact on the municipal road system. Waterfront activities are usually high generators of traffic and are often located in areas with poor access. Major developments can cause serious disruption to already overburdened systems.

A detailed analysis of the existing road system should be made since its ability to handle any extra traffic could be a prime constraint on the nature of the waterfront plan. The basic analysis should include the following:

- type of local road system (one-way, two-way)
- capacity of major arterials to the waterfront area
- peak traffic flow (weekends, evenings, etc.)
- projected increase in local traffic over the next 5-10 year period (without waterfront development)
- projected traffic generation (peak and annual) from proposed development
- intersections needing improvement
- local parking capacity and condition
- net impact of new waterfront development on the road system (above normal increase)
- access points to new development
- access to recreational areas, boat launching ramps, viewing areas, etc.
- access for public transit, fire and emergency vehicles.

Other Utilities: Other utilities could include water, gas, hydro and telephone services. They will likely be less critical than other major services in affecting the waterfront plan. However, their capacities in terms of properly servicing any development should be determined.

PUBLIC ACCESS ISSUES

The whole question of public access usually stimulates significant community debate. The general feeling is that the public should have the maximum possible access to a waterfront. This is particularly the case in an urban environment where water and open space are scarce. Nevertheless, the requirements for sufficient public access should be practical and realistic to achieve in light of other priorities for the improvement of the waterfront.

Public access along a waterfront can impose restrictions on the design and marketing of a new development. For example, it may not be possible to allow public access through a marina for reasons of security. Yet it may be in the best interests of the community to have the marina. In this case the visual aspects may be most important, and outlooks without access may be created.

Outlooks may need to be created when public access must be restricted (Port Dalhousie).

Waterfront traffic should also not disrupt the local residential fabric. As much traffic as possible should be kept off the residential streets. This subject has divided many communities and has contributed to the defeat of several waterfront proposals.

At the locks on the Welland Canal public access is limited, but observation decks allow visitors to watch the activity in safety.

Pedestrian access will also require careful planning. This is particularly so where there are barriers, such as highways or railway lines, along the waterfront. If the area is used by industry or is a working waterfront (i.e. fishing, boat building), then pedestrian access may be subject to a number of restrictions.

Barriers: There are various types of barrier which interfere with people's access to, and enjoyment, of the waterfront. These can be either physical or psychological barriers. Both take their toll on the public's enjoyment of the waterfront.

Psychological barriers involve real or perceived threats to safety, such as vulnerability to crime or lack of protection from deep water. If the user feels uncomfortable or threatened by other user groups or feels the area to be dirty or neglected, this also constitutes a form of psychological barrier.

Some of the more common physical barriers found on the waterfront are utility structures, waste treatment facilities and electrical generating plants. They tend to occupy waterfront space, but not permit public use. Major roadways, too, often present a barrier and should be screened with vegetation or berms, and made safe (overpasses, underpasses or lights) in order to minimize their impact.

Railway lands often occupy large areas along a waterfront and these can constitute a significant access barrier. This stems from the period when railways linked up to shipping routes. In the larger communities it may be uneconomic to relocate all the lines away from the waterfront. Rather than view this as a total obstacle to development, some communities have chosen to work around the tracks. If the lines are lightly used, public access may still be possible under controlled conditions. In some cases, a negotiated solution may be worked out with the railway company to relocate, lease or sell lands where the tracks are unused.

The waterbody itself can also be a barrier if attractions are located on both banks. This can be overcome, however, and pedestrian bridges and walkways have been used effectively to connect parts of a waterfront, contributing to the overall water-related experience.

PHYSICAL CHARACTERISTICS AND FEATURES

This section is concerned with site specific potential and constraints. These relate to two categories, land and water, as well as the interface between the two.

TERRAIN CONDITIONS AND TOPOGRAPHY

Waterfront redevelopment frequently takes place on sites that are less than perfect for construction. The conditions can range from natural wetlands to areas that are unstable because they were created by landfill. Periodic flooding and high water tables may limit development opportunities or create specific conditions to be respected in the detailed design and implementation phase. It is important, therefore, that a thorough site analysis and evaluation of the existing terrain conditions be undertaken in this stage of the waterfront planning exercise.

Flood Plains: For waterfronts on rivers and streams, and in some cases lakes, flood plain characteristics are probably the single most important consideration in waterfront planning. New development, or any alterations to existing development, may be subject to restrictions or flood proofing requirements, depending on the nature of the flooding situation.

Extensive studies have been undertaken dealing with the nature of flooding in river and stream systems in Ontario. Flood plain mapping has been carried out for many major waterways which indicate flood levels that can be expected during the most severe conditions. This information can be used to prepare policies regarding development in flood plain areas.

In flood plain areas, new development, or alterations to existing development, may be subject to restrictions (Campbellford).

Topography: It is important to be aware of the land forms in the waterfront area both above and below water level. The land topography will have a major impact on the type of development that can take place on the shore. A beach or a boat launch ramp would be an impossibility on a high, rocky shoreline. Construction will have to be undertaken with care on a low-lying or unstable water's edge. The underwater topography will also have a major impact on the type of water-related activities that can be planned for the area; whether they are beaches, marinas or swimming areas.

As part of the physical analysis inventory, certain geotechnical information should be obtained regarding the waterfront and its environs. This information should be collected, mapped and analyzed before any construction can take place. Factors which should be taken into account include:

- existing soundings in the near-shore area
- nature of soils in the development area and on the water bottom
- soil borings to determine sub-surface conditions
- water quality information
- slope stability
- erosion susceptibility.

HYDROLOGICAL FACTORS

In planning waterfront developments, it is essential that the hydrological characteristics of the particular body of water be considered. Hydrological factors relate to the unique characteristics of a body of water subjected to various conditions.

The major hydrological factors which can affect waterfront planning and design are:

- water level fluctuation
- wave climate and characteristics
- currents
- ice.

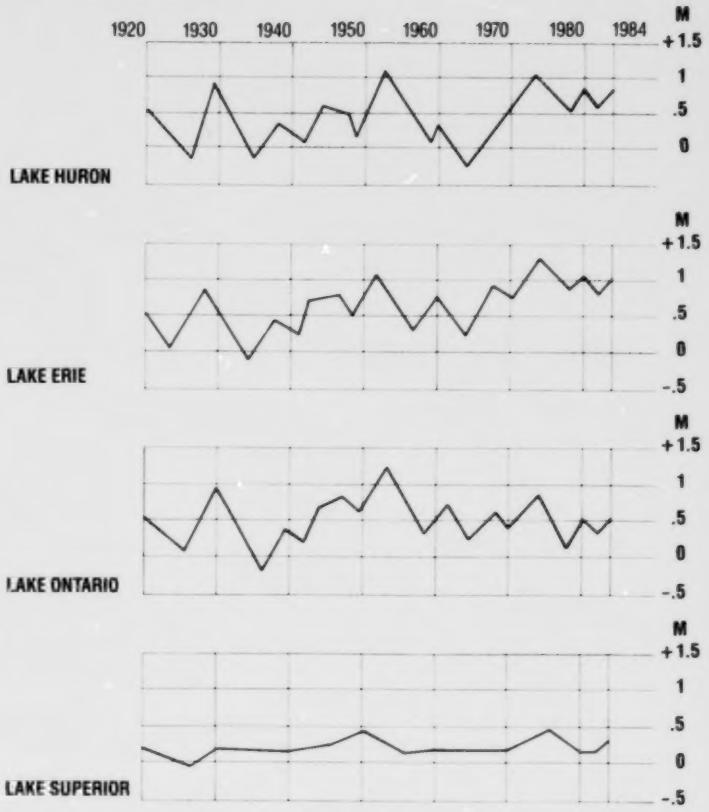
Water Level Fluctuation: Water levels fluctuate due to a number of factors, the most significant of which are changes in weather and the effects of wind blowing over the surface of the water (wind set-up). Annual changes in water levels occur due to the natural process of spring run-off and subsequent evaporation. Changes in precipitation and temperature over the longer term can also have a significant effect on water levels.

Over a period of ten years or so, the water levels on the Great Lakes can change by one metre or more. On smaller water systems the changes are usually less dramatic but, nevertheless, can affect the land water interface and related waterfront development.

Water levels can be controlled to some extent by hydraulic structures such as dams and spillways. However, these controls are often not adequate to deal with severe conditions, and waterfront developments should be designed to accommodate worst-case situations.

Short term fluctuations in water levels are due to what is known as "wind set-up". When the wind continues to blow over the lake surface for a period of time, a surface tilt is produced. The amount of wind set-up depends on the length of open water or "fetch" and the depth of the lake. Wind set-up conditions can raise water levels on the Great Lakes by one metre or more.

Great Lakes water levels



Wind set-up

Wave Climate: Wave impact on waterfront development must also be considered in the planning and design of waterfront projects. Wave generation can be particularly troublesome when compounded by high water levels. This is especially true of the Great Lakes where severe storms can produce waves which may result in the flooding of poorly protected waterfront facilities and cause serious damage. The problem is not unique to the Great Lakes. Other large inland lakes can also produce wave heights with potentially damaging effects.

The height of waves reaching shore is dependent on wind velocity and the characteristics of the near shore zone where the waves will break. These characteristics are site specific and must be analyzed individually.

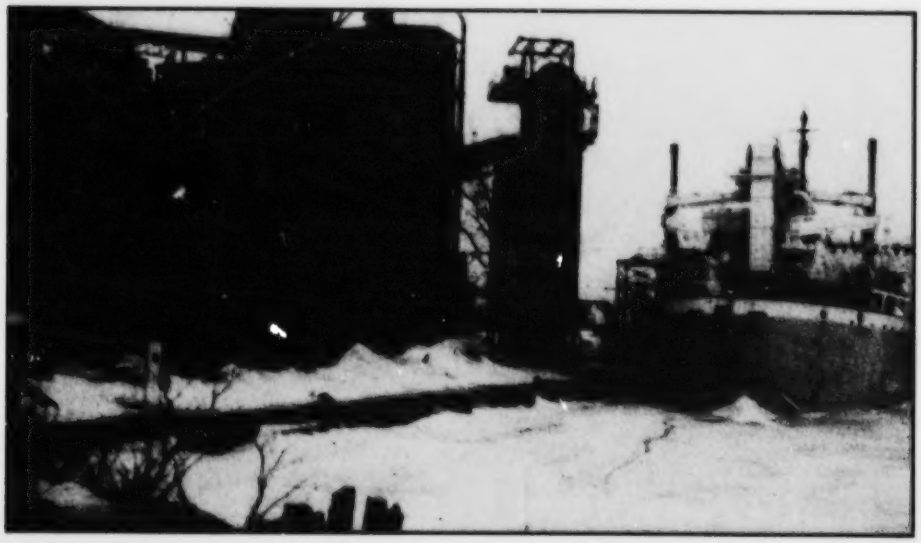
Currents: Predominant current directions will have an effect on the waterfront and must be considered. The main effects of current flow are in the depositing of silt and sand and pollution routing. These considerations are especially important when the plan includes the establishment of a beach or recreational boating area or protection of an existing fish habitat.

Insensitive planning and design can also create problems with established waterfront activities. New structures can cause current changes which will affect siltation patterns and possibly interfere with existing activities such as boating, swimming and fishing.

Information on hydrological conditions for the Great Lakes can be obtained from the Canada Centre for Inland Waters. Hydrological information on other bodies of water can be obtained from local conservation authorities and/or the Ministry of Natural Resources.

Ice: In northern waters ice formation is a major problem and may be the most important factor influencing the design of a structure. During the winter months ice forms along the shore, providing continuous protection from wave action. Areas on the leeward side of prevailing winds are particularly susceptible to ice formation. This can produce problems when the ice is attached to structures and is then lifted by increasing water levels in spring. Ice can also cause extensive damage to piles and armour stones.

Wind blowing over ice at the shore can produce ridging and large build-ups, sometimes exceeding five metres. This ice can scour away sections of the shore and destroy buildings close to the shoreline. It can also pile up in the river and cause flooding. Knowledge of ice build-up is crucial in assessing a site for development and/or a particular use.



Ice may be the most important factor influencing the design and location of waterfront structures.

ENVIRONMENTAL QUALITY

Because of the extreme susceptibility of waterfronts and waterbodies to environmental damage, it is important that an assessment of environmental quality form part of the preliminary analysis. This may be a major determining factor when considering what activities can be located on the waterfront.

This assessment should include information to form a comprehensive environmental data base:

- quality and quantity of water in lakes, rivers, streams, aquifers
- existing industrial waste management practices
- soil contamination, if any
- existing air quality
- air management practices
- natural resources: fish and wildlife habitat, e.g. spawning beds.

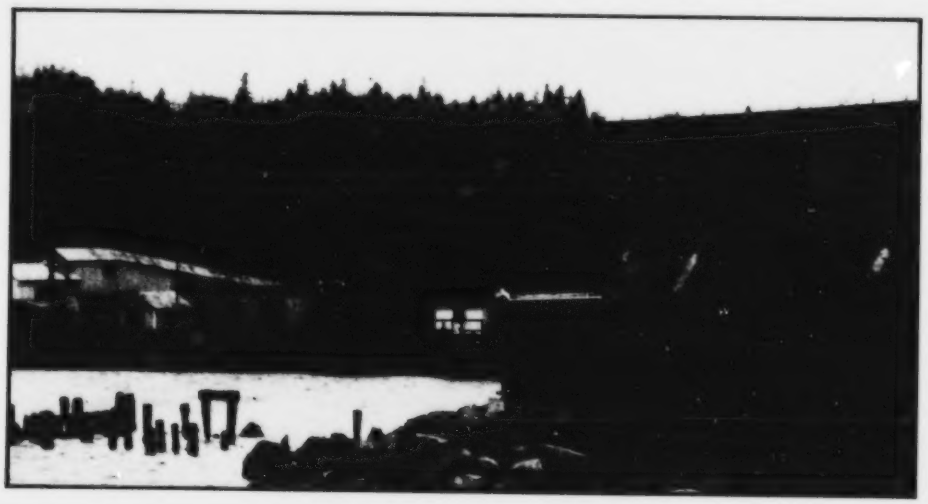
EXISTING SHORE STRUCTURES

Existing shore structures should be examined as one of the first steps in the analysis of the physical setting for the waterfront plan. Many waterfronts already have various structures, such as piers, shorewalls and breakwaters, which were built as part of earlier waterfront developments. An inventory of these structures, their condition and effectiveness, will give an indication of their usefulness in any future developments. This is important because they are expensive to repair or replace and advantage should be taken of any facilities which may still have a useful life. In some instances old structures may be buried, in which case soundings should be made to pin-point their location prior to new development being undertaken.

In examining such structures, certain facts related to their condition should be determined:

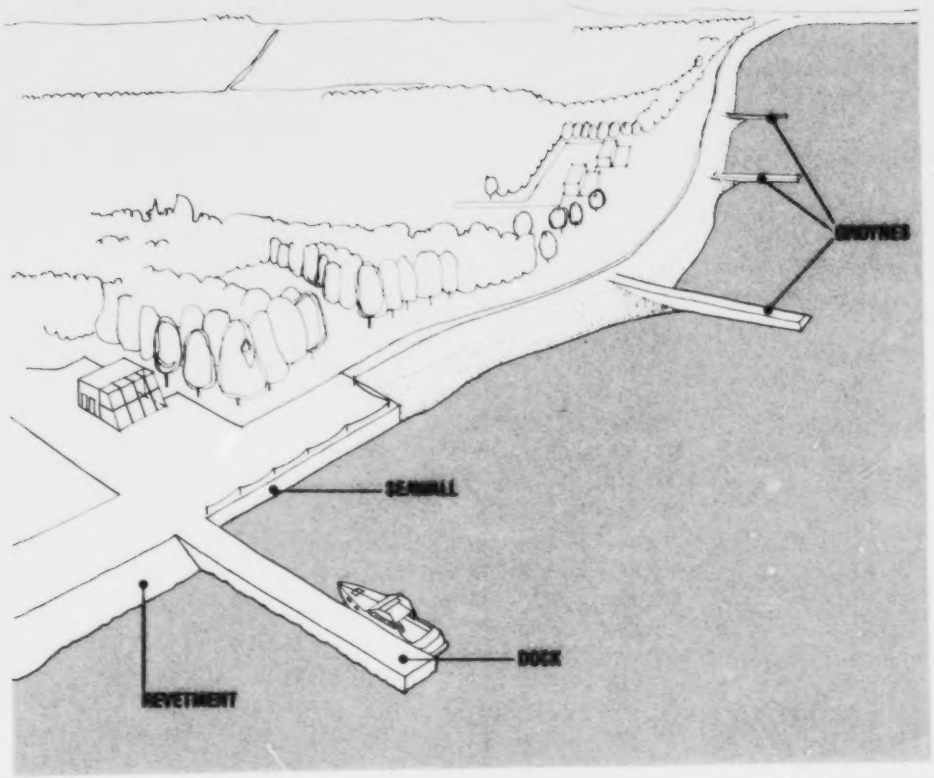
- type of construction (concrete, wood, etc.)
- general condition of structure
- adequate height for water fluctuations
- toe protection
- relationship to proposed development
- effectiveness (alignment, placement, etc.)
- coordinated protection design
- cost of repair or replacement.

The results of the survey should be mapped on a site plan which summarizes the information and relates it to adjacent development.



Existing shore structures, in various states of repair, can be found on many waterfronts (Michipicoten Harbour).

Existing shore structures



MICROCLIMATE AND SPECIAL SITE CONDITIONS

Microclimatic concerns should be recognized and dealt with in the planning and design of the waterfront. If they are ignored then conditions can be created that make a particular site or attraction unusable at certain times of the year. Other sites could, for example, suffer economic losses due to flooding or ice damage if the local conditions are ignored.

If strong winds are common, this will indicate how a site should be used and what mitigating measures are necessary. It might indicate the need for buffering of activity areas or a change in building orientations. Depending upon wind direction and currents, microclimate could be a key determinant in the location of marinas and the potential for recreational boating.

The amount of snowfall, too, should be taken into account. A site which receives excessive snowfall may be less suitable for certain activities (e.g. a skating rink) than other areas of the community.

Microclimate should be a key concern when planning waterfront uses.

USERS AND THEIR NEEDS

Once the physical environment of the waterfront has been examined the present user groups should be identified along with those who might potentially be attracted to a new development. Two distinct waterfront user groups are local residents and tourists. These groups may be further defined, for example, local residents may be comprised of individuals, industry, community organizations, boaters, neighbourhood groups and business people. The tourist category will include boaters as well as land-based visitors, who may be either in transit or using the community as a destination point.

MARKET IDENTIFICATION

Market identification will help to determine the present and potential users and types of development to be considered. Attention should be paid to tourism-commercial uses, recreational and residential uses and the market available to maintain their existence. Given the recreational importance and potential for the municipality to capitalize on this valuable asset, studies involving boating resources should be made to determine the waterfront's relative strengths and weakness. Included in these strengths and weaknesses would be its regional population, the nature of the waterbody, its suitability for boating, water sports or fishing. The extent of the land-oriented recreational facilities, such as tennis courts, park space, and pedestrian nodes that are likely to draw the public to the waterfront is also of concern.

BOATING NEEDS

In Ontario the development of marina facilities has been an important catalyst in waterfront development. The users of such a facility may be either local residents or transient boaters. In view of this, the special needs of boaters must be dealt with when defining potential waterfront users. A boating demand study is recommended for any marina development, particularly a transient facility.

A typical boating demand study would include:

- characteristics of the existing fleet by type of craft (power or sail)
- size of boats
- boat ownership trends over a number of years
- inventory of existing docking facilities in the area
- examination of capacity or waiting list information
- inventory of existing marina services in the area (fully serviced docking, repair, lift out, winter storage, pump out, showers)
- estimates of boating population in anticipated market areas
- existing boater cruising patterns and destinations (including accommodation facilities and flows of boaters in the area).

The special needs of boaters should be taken into account when studying waterfront users.

In general, municipalities should confine themselves to the operation of transient facilities, leaving the seasonal marinas to the private sector. Private marina operators cannot compete with marinas funded with public money and perceive this as unfair competition. Full service facilities, such as winter storage, boat repairs and equipment sales, should be left to the private sector since a marina needs a mix of these services to be profitable. Transient facilities, on the other hand, can generate substantial economic spin-offs to the municipality, even though the marina itself is not a major source of revenue. Municipalities can, in this way, reap benefits from a transient facility which the private sector operator is not able to do.

TOURISM DEMAND

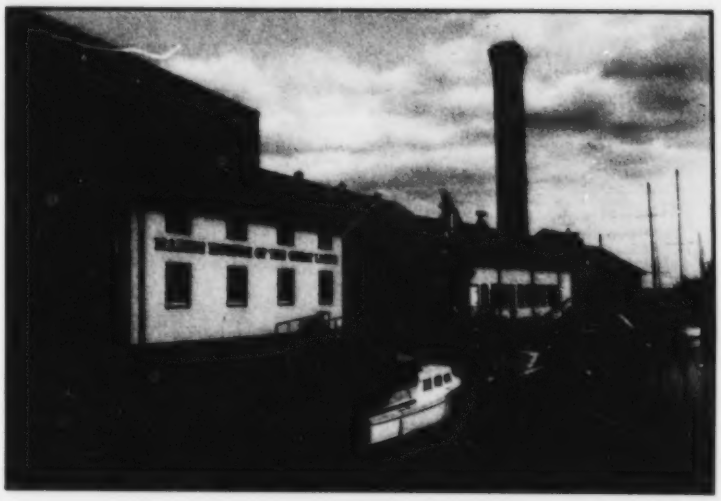
Tourism demand is an important facet to consider in waterfront planning. It should be remembered that there are two kinds of tourism; one is "destination tourism", the other is "touring". Waterfronts are able to attract both kinds but the majority of visitors are likely to fall into the second category. It is important to differentiate between these two markets as the promotional efforts will differ depending on which sector is targeted.

A pre-conception of what this market might encompass, for example, boaters, shoppers or tourists seeking water related recreational facilities (beaches, parks,etc.) is important to begin with. Without such an idea of the possible market, time and effort could be wasted pursuing non-viable alternatives.

The needs of tourists should be addressed in terms of:

- characteristics of users
- population and age breakdown
- characteristics of use: when, where
- facility requirements
- types of events
- access, mode of transportation.

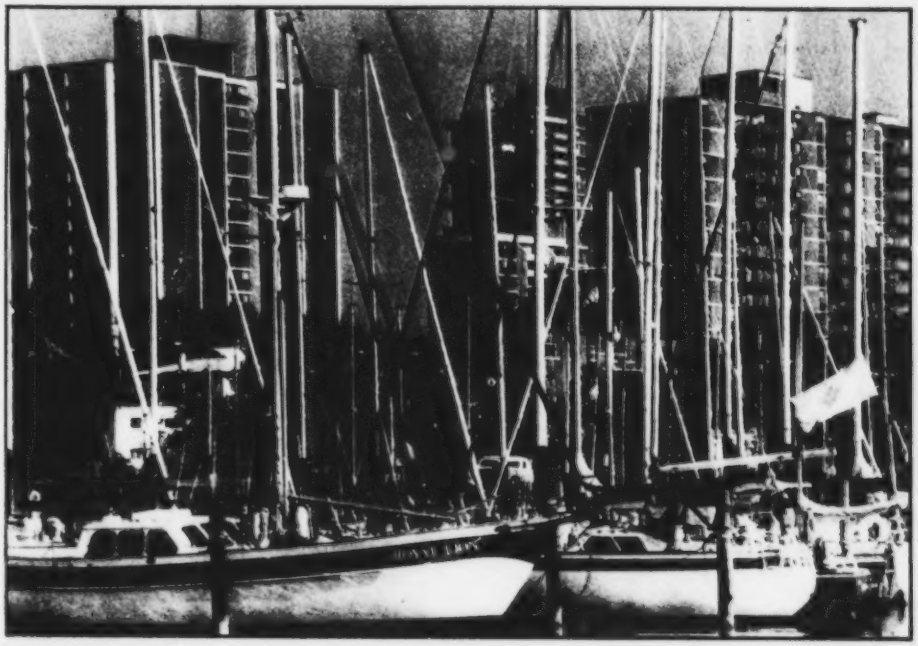
If the municipality has an existing working waterfront, tourism development should be pursued with caution and sensitivity. Although tourism and waterfront industry can co-exist, the potential for conflict should be recognized at the planning stage so that those people who earn their living on the waterfront do not feel that they are being driven out by crowds of visitors.



Marine museum of the Great Lakes in Kingston.

4.

DESIGNING THE WATERFRONT



A knowledge of environmental protection techniques and appropriate waterfront design is essential to the development of feasible concept plans. The following topics will be examined in relation to the design of a waterfront project:

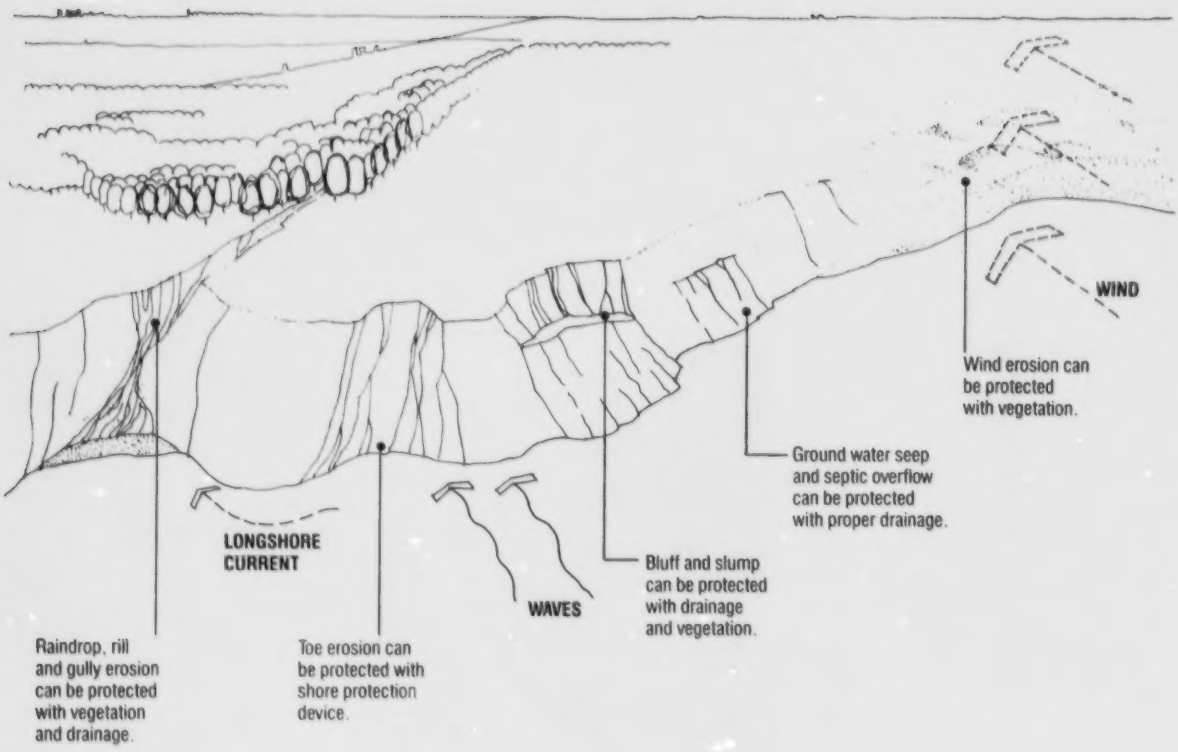
- shoreline protection
- public access areas
- beaches
- recreational boating
- landscaping for improving the waterfront
- urban design.

SHORELINE PROTECTION

One of the factors that make waterfront development different from development elsewhere is the fragility of the water's edge. Problems can arise from tampering with this edge and developing on adjacent lands. However, when coordinated solutions are undertaken, the cost and the potential for adverse impacts from development can be significantly reduced, while at the same time actually increasing shoreline protection.

Edge treatment includes the various ways in which the interface between land and water is treated. This involves both hard edge treatment such as shorewalls and breakwaters, and soft edge treatment using various landscaping techniques.

Causes of shore erosion


WIND
Wind erosion can be protected with vegetation.
Ground water seep and septic overflow can be protected with proper drainage.
Bluff and slump can be protected with drainage and vegetation.
WAVES
LONGSHORE CURRENT
Raindrop, rill and gully erosion can be protected with vegetation and drainage.
Toe erosion can be protected with shore protection device.

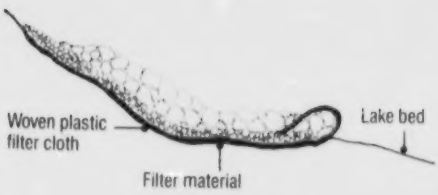
The purpose of edge treatment is to both protect the waterfront from hydrological forces and provide a firm structural base for waterfront activities. This section describes the types of structural solutions which can help deal with the various hydrological forces acting upon waterfront developments.

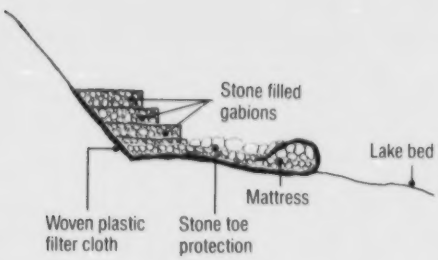
REVETMENTS

A revetment is a facing of stone, concrete, etc., built to protect an embankment or shore structure against erosion and collapse as a result of wave action and currents. It is usually designed to withstand the full force of wave action since it is built right on the water line. Revetments are essentially a hardening of the existing slope using materials resistant to wave action and erosion.

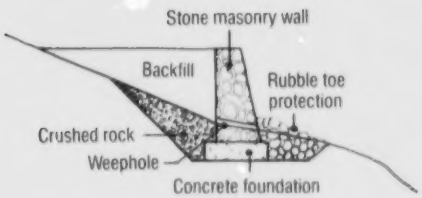
Properly designed revetments can have long life spans, if well maintained, and should have little or no effect on water quality. However, they do limit access to the water because they result in either a steep drop in elevation or a strip of shoreline which is not comfortable to walk or sit on.

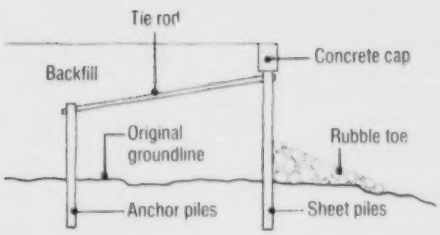
Revetments





Shorewalls





SHOREWALLS

Shorewalls serve much the same purpose as revetments. They, also, are constructed parallel to the water's edge and are used to stabilize it and prevent erosion. They provide direct access to the water and, in some circumstances, can be an excellent base for waterfront activities, e.g. fishing and boat mooring.

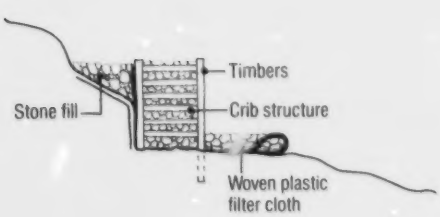
Shorewalls are also, generally, a more rigid structural configuration. Like revetments they are costly, but if properly constructed should have relatively low maintenance costs. There should be few adverse environmental effects due to shorewall construction.

GROYNES

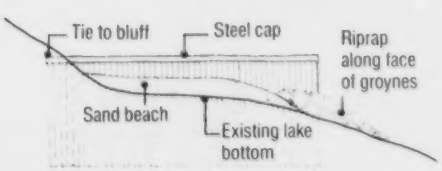
Groynes are used to create and protect beaches. They are structural devices built into the shore perpendicular to the beach at various intervals which intercept current flows to capture littoral drift (material transported from erosion zones) and enhance sand deposits. Groynes vary greatly in cost and maintenance depending on the type of construction.

Like breakwaters, groynes interfere with shore processes and must be used with extreme caution. In particular, care must be exercised that down-drift areas are not robbed of sand. Properly designed groyne systems should not produce any adverse environmental effects.

Shorewalls



Groynes



BREAKWATERS

Breakwaters are one of the most important protection devices, for example, protecting marinas which may otherwise receive an unacceptable amount of damage. Breakwaters can be used in combination with revetments and shorewalls to provide further protection by intercepting and dispersing wave energy before it reaches the shore. However, they can be very expensive to construct and the need for them should be carefully assessed before deciding on this approach.

Breakwaters also interfere with natural shore processes and their use demands caution because they may cause unwanted disruption in siltation and erosion patterns.

Breakwaters

LANDFILL

The use of landfill to create new waterfront areas, and as a basis for development activity occurs frequently in waterfront planning. Before using landfill very careful analysis should be undertaken as it can alter natural shore processes and cause major environmental changes.

A park and additional parking were created on landfill in Kenora.

The use of landfill as an edge treatment should be carried out in conjunction with proper structural protection such as revetments or shorewalls and/or landscaping enhancement. The overall effect of such treatments should be analyzed in terms of any impact on adjacent shore facilities or activities. Such impacts could include:

- alteration of littoral drift
- changes in sedimentation patterns
- possible effects on existing fishing and spawning areas.

The placing of fill in the water or on the shore is regulated under the Lakes and Rivers Improvement Act and the Conservation Authorities Act. In planning for landfill sites, the local conservation authority, if there is one, and the Ministry of Natural Resources should be contacted.

The type of material used for fill should be carefully selected depending on its function. Fill which will be used as a basis for construction activities will require different properties from that used for a beach or decorative treatment. It should be clean with no harmful contaminants.

The cost of fill depends upon its availability and distance from the site. In areas remote from construction sites the transportation of fill material can be a major cost. This should be determined before the use of fill as part of a waterfront plan is assumed. In urban areas with an active construction industry, fill is usually readily available and inexpensive.

LANDSCAPING FOR SHORELINE MANAGEMENT

The shorelines along the various Ontario waterbodies differ significantly. However, many found around the Great Lakes are susceptible to erosion, e.g. erodible bluffs, low plains, sand dunes and wetlands. Problems relating to slope stability, drainage and flooding are common. All are subject to the following problems which might occur, either individually or in combination:

- wave action
- groundwater seepage
- wind erosion
- surface run-off
- ice.

Shoreline vegetation not only improves the visual appearance, especially from the water, but also performs the following functions:

- absorbs the impact of falling rain
- slows the wind velocity and traps wind-blown sediment
- helps maintain the absorptive capacity of the soil
- reduces frost penetration
- provides wildlife habitats.

Successful plant selection for shoreline management depends on several different factors:

- proposed activity in area of planting
- soil limitations: textures, alkalinity, acidity, toxicity, nutrient imbalance (consult soil expert)
- slope
- availability of plant species
- aesthetics
- micro-climate.

Boardwalk at the Wye Marsh Wildlife Interpretation Centre.

All sand dunes and wetlands are susceptible to damage from even the most minor human disturbances. Therefore, these areas should be well protected. For example, a boardwalk might be placed over wetlands if access is desired. The Wye Marsh near Midland is a good example of appropriate marshland edge treatment.

In areas where structural protection against wave action (e.g. groynes, breakwaters or revetments) has been set in place, it should be supplemented by establishing vegetation on the adjacent backshore or bluff areas. In order to develop areas with little or no natural beach, steep slopes or groundwater seepage problems and poor vegetation, a combination of structural treatment, drainage, and vegetation control is required.

Sand dunes provide a very specific environment which should be closely guarded. Sand dunes, both old and new, are fragile features of the shore and readily affected by human activities. Natural vegetation on a sand dune is easily damaged by pedestrian or vehicular traffic. When vegetation is disturbed, stabilization is lost and sand blown away. Driftwood and fallen trees help protect these areas and should not be removed for the sake of a "clean" beach. Plant materials can be introduced to stabilize dunes and artificial beach nourishment can be provided by hauling in sand. Gravel can also be used to create a necessary buffer area provided that no detrimental environmental effects occur.

Additional considerations for planting on shorelines would include the following:

- height of plants should not conflict with views
- clear-cutting should be avoided, instead, use selective pruning
- stairways instead of footpaths should lead down bluffs or slopes.

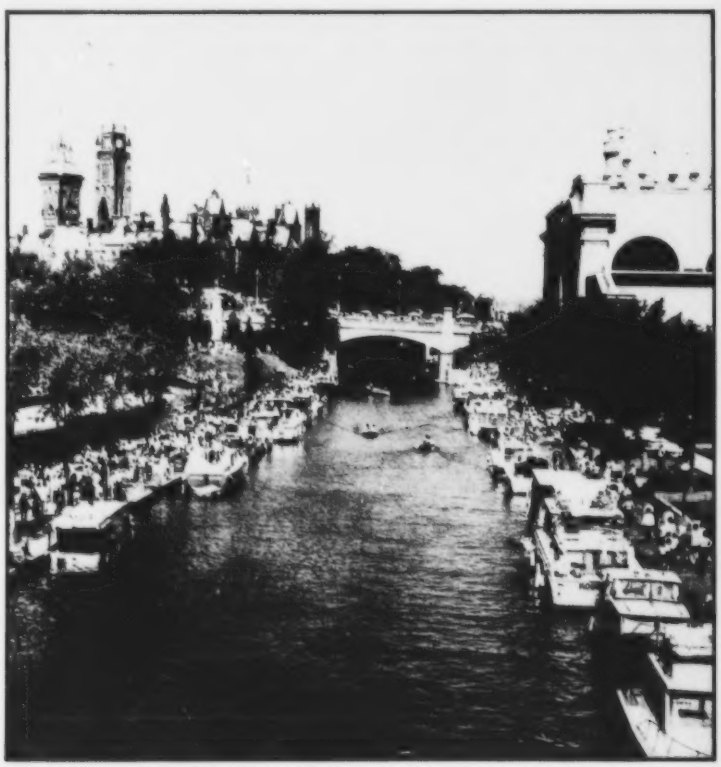
PROFESSIONAL ADVICE

When considering shoreline improvements, the services of a qualified coastal engineering firm should be sought. The planning and design of coastal and marine facilities is complex and professional assistance is essential to ensure that they are properly designed and located. Improperly designed and sized shore works can cause more problems than they solve. This can include environmental disruption as well as adverse physical effects on surrounding properties. For these reasons, no construction should take place without the input of qualified experts.

PUBLIC ACCESS AREAS

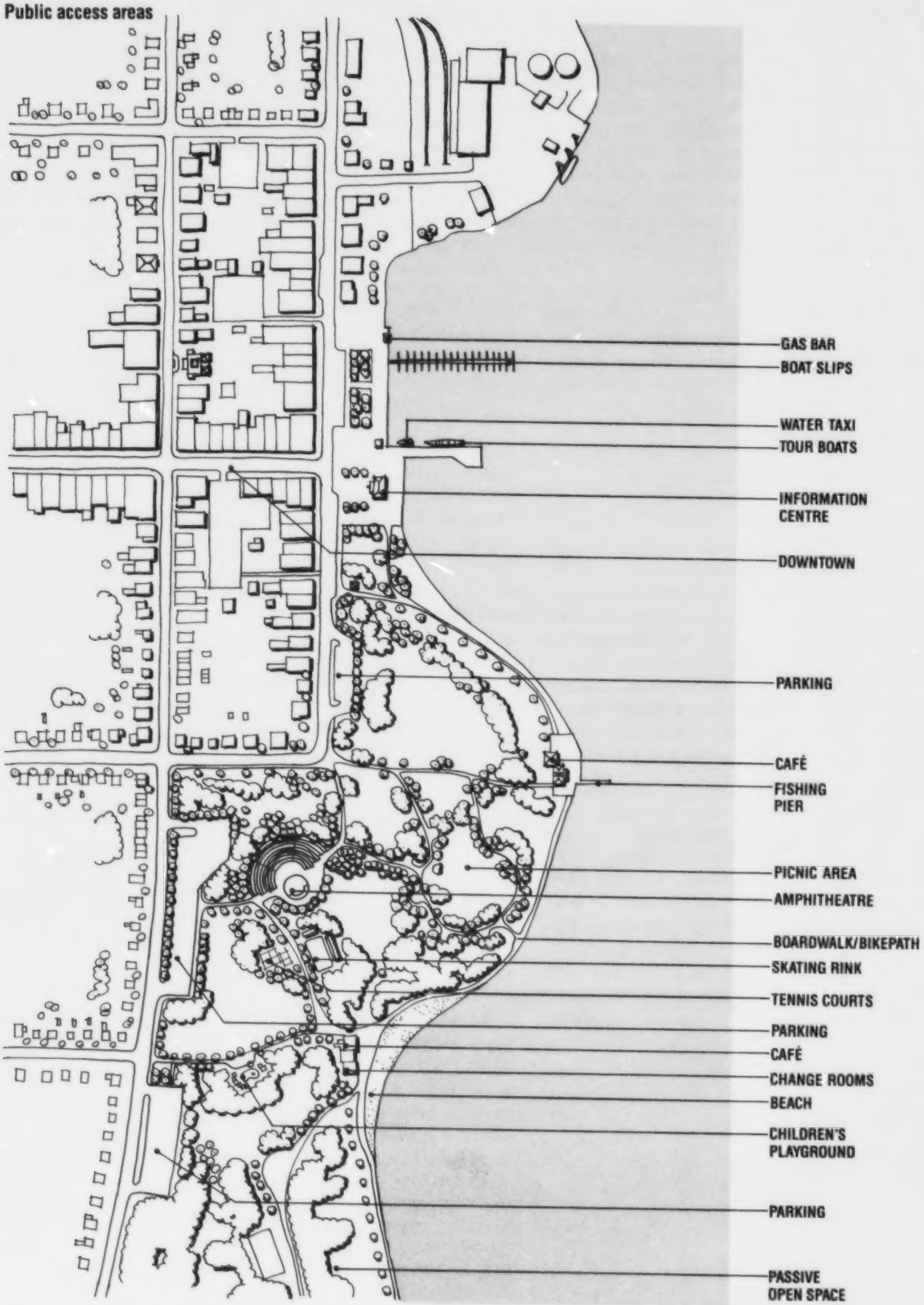
Public access areas along urban waterfronts will generally have a recreational orientation and can be active or passive in nature. These are people-oriented places and should also relate to the water. The waterfront recreational plan should consider all waterfront open space as part of a system with linkages, rather than as individual components in isolation. In this way, an integrated open space network can be developed with public use activity nodes being linked by walkways and bike paths.

A public use node on the waterfront may take many forms: a plaza or square, a park, a vehicular or pedestrian overlook, an amphitheatre. Water may be a prominent feature, entering the space literally (as in an inlet) or symbolically (with a fountain). The water's edge should be maximized, with as much exposure for the user as possible. An example would be an inlet that is brought into a plaza with seating surrounding it. The location of the node should relate to both the potential for offshore views and to the developed areas on shore.



Many summer events take place on the Rideau Canal in Ottawa.

Public access areas



PLAZAS

A plaza developed on the waterfront can serve a variety of functions. It could simply be a people space, or it might serve as a transportation node: boat (ferry or private), car, bus or plane. The plaza could also relate to a work place, such as an industrial plant or office building, with seating for the workers. (Sarnia's waterfront has these types of office waterfront nodes.) Finally, the plaza could be part of a park, with seating or active uses, such as a skating rink or tot lot. In all cases, the waterfront plaza can serve as a focal point or node.

Confederation Park in Kingston is a good example of a plaza in a waterfront park which knits together the urban fabric of the CBD with uses along the lake (the transient marina, hotels, etc.).

A plaza may also be complementary to arenas, museums, libraries, or community halls, allowing activities to spill outside when weather permits. A public ice rink adjacent to a private commercial use, such as a restaurant which could offer shelter as well as refreshment, would benefit both activities. A waterfront node adjacent to a commercial development, such as restaurants and shopping, can become an important focus of activity for both local residents and tourists.

PARKS

Large open spaces and picnic areas are very much in demand in a waterfront location. However, unless tied in with some other destination, or designed with winter usage in mind, a park is likely to be neglected during the colder seasons. It would be best to plan for activities and programme events to ensure year round usage. A park as part of a linear system, perhaps housing fitness equipment as in Belleville, stands a greater chance of year-round use.

LINKS AND PATHS

Waterfront pathways can attract users, control circulation and strengthen ties between the waterfront and the CBD. They can also connect parts of the waterfront. The links should be considered as features in themselves, as well as extensions of the municipal pedestrian system. A unique character can be developed by the use of coordinated design for furniture, paving, fencing, lighting and sculpture.

Interpretive and informative signs related to the cultural or natural landscape can turn a purely functional system into a recreational experience. Walkways should maximize the impact of the location and pedestrian destinations, rather than merely provide a means of public access. Every attempt should be made to develop an environment that assists the user in experiencing the interaction of land and water to the fullest extent. Planting can help by directing and protecting pedestrians, as well as contributing to the attractiveness of the paths.

Walkways should also allow the pedestrian to experience the waterfront from different perspectives and provide a variety of views. Both horizontal and vertical alignments can increase the variety of experiences from being down in a marshland on a boardwalk to being elevated along a bluff overlooking a waterbody. Many communities, such as Brantford, have taken advantage of levees for flood protection to create public walkways and fitness trails.

PUBLIC VIEWING AREAS

An overlook may be considered a passive public space with a specific purpose: to present a view of the waterfront. The overlook may be elevated or decked, secluded or very public. It may offer a view of the natural environment or even a view of the working environment.

An overlook may be oriented to pedestrians or vehicles. Given the winter climate of Ontario, vehicular look-outs can be important as a means of ensuring year-round enjoyment of the waterfront.

Sitting area overlooking the Grand River in Cambridge.

North Bay and Brockville have both recognized this and incorporated vehicular look-outs into waterfront development programs.

FISHING PIERS

Fishing is a sport that brings together all age groups as well as a cross-section of society. People love to fish from bridges, docks, shorewalls, riverbanks or the lakeshore and will manage to do so whether facilities are provided or not. However, if fishing is to be considered as a recognized sport, then those who participate should have the same access to facilities as boaters or tennis players. Another important reason for providing proper facilities is to ensure the safety of the participants. Finally, a fishing pier may be a potential source of municipal revenue if fees are charged, as well as a possible tourist attraction.

Piers can be either privately or publicly operated, or a combination of both. They can range from very simple with few or no amenities, to extremely large and expensive piers with a wide range of amenities. The following is a description of the different types of piers that may be considered:

Large Public Recreational Fishing Piers

- Expensive/large public investment/ may recoup losses if fees are charged
- May contain other facilities (bait shop, rest rooms, fish cleaning stations etc.)
- Part of an extensive open space system
- May charge admission

Focal Point Piers

- Serve more than one purpose
- Act as a community focal point
- Facilities such as snack bars, restaurants, souvenir shops, as well as the ambience, attract both residents and tourists

Multi-Use Piers

- Not built primarily for anglers
- Fishing may be incidental to other activities — recreational, commercial or industrial — for example, port authority offices, boat docking, storage sheds, etc.
- May only provide access or may provide bait shops, cleaning facilities, etc.

Stocking this storm retention pond with fish made it a popular spot for young anglers (Meadowvale).

"No-Frills" Piers

- Less elaborate and shorter than the above
- No facilities, only a way to get out over the water
- Lighting may be provided

Rehabilitated Piers

- Many communities have old rotting piers which can be expensive to remove
- If the piles are still in good shape then it may be possible to repair the pier

River Piers

- Swift currents, ice, flooding and changing tidal levels must be taken into account when designing piers along rivers
- The pier may have to run parallel to the water
- It may have to be cantilevered out over the water

Other Fishing Areas

Protection Devices (breakwaters, shorewalls, revetments)

- A walkway or platform on top may be included at little extra cost

Bridges

- Informal use may be made of sidewalks or the edge of bridges, if there is room
- Catwalks may be built next to or below the bridge
- Unused bridges may be converted into piers

Power Plants

- Warm water discharge can create an ideal fishing environment
- May be landscaped with a pier and/or parking added

Anglers in Meaford.

Floating Piers

- Smaller and lower in cost
- Can be easily moved

There are a number of general considerations that should be taken into account when locating, building or operating a pier. The following is a list of these elements which apply to all the types of pier previously mentioned to a greater or lesser degree.

Approvals: should be obtained from federal and provincial authorities.

Artificial Reefs: man-made structures that provide food, shelter, protection and spawning areas.

Bait and Tackle Shops: may help to control vandalism; must have refrigeration and bait tanks; may offer drinks and snacks.

Contamination: guidelines on safe fish consumption should be posted.

Design: the following design features, which are common to most types, should be taken into account when building a pier: pilings, walkways, decking, railings, lights and amenities.

Fees: each municipality has to decide how this question will be handled.

Fish Cleaning Stations: require running water and possibly shelter. Attract spectators as well as anglers.

Food: can range from a snack bar to a full service restaurant.

Rest Rooms: may be prone to vandalism and access may have to be controlled.

Siting: preferences of local anglers as well as winds, type of waterbody, fish habitats etc. should be taken into account.

Vandalism: surveillance as well as design is crucial if this is to be minimized.[1]

BEACHES

Beaches and related activities are highly valued by the majority of people, particularly city dwellers. It is important, therefore, that enough space be devoted to a beach area and that it be sited properly so that it will offer lasting recreational opportunities.

Natural beaches occur as a result of several factors: soils on site, water currents, exposure to winds, the distance between the water's edge, and limit of vegetation growth which absorbs the energy of waves during storm conditions. Artificial beaches are difficult to maintain because these ingredients do not occur naturally, and as a result should only be planned under carefully controlled conditions.

- Good water quality in addition to good sun exposure, with south, east and west facing orientations being preferred. The site should be exposed to sun for as much of the day as possible.
- Prevailing winds should blow to the shore drawing warmed surface water to the bathing area, and creating sufficient breeze to discourage flying insects.
- With a natural beach, the existing vegetation must be protected to prevent erosion and destruction of the back shore.

A beach at Campbellford.

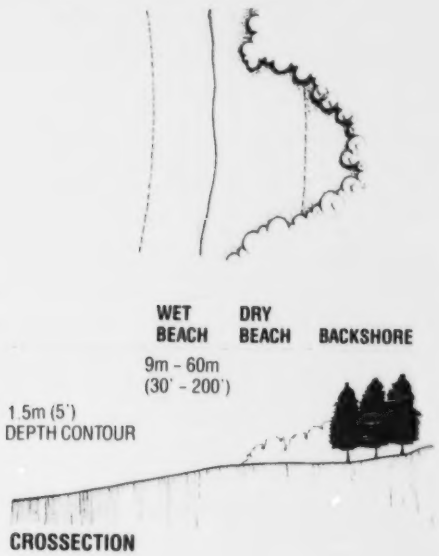
BEACH AREA AND SITING CONSIDERATIONS

Beaches are composed of both wet and dry areas. The wet beach is where water activity occurs and is bounded by the water line and the 5' (1.5m) depth contour. This is the depth at which most people are still able to touch bottom. It may be varied according to user needs (e.g. children's beach, handicapped use). Some guidelines related to the wet beach as set forth in **Ontario Provincial Parks: Landscape Design Principles and Guidelines**, are as follows:

- The minimum useful wet beach width is 9m (30') from the shore to the 1.5m (5') depth contour. A narrower wet beach will have too steep and abrupt a shore.
- The maximum wet beach width is 60m (200') from the shore or the distance to the 1.5 m (5') depth contour, whichever comes first; to ensure reasonable travel distance from the shore.
- Bottom materials should be firm and free from dangerous obstructions or sharp objects.
- A sand bottom is preferable for children, a rocky bottom may be appropriate for more experienced swimmers.

[1] For more information on the design of fishing piers the following publication should be consulted: Ann Breen and Dick Rigby, **Fishing Piers: What Cities Can Do**, The Waterfront Press, Washington, D.C., 1986.

Siting considerations for beaches



The dry beach is the area bounded by the water line and the back shore edge which is used for activities such as sunning, sitting, playing frisbee, etc. The backshore edge is located 30m (100') from the water line, or at the limit of the usable land (well drained, moderate slope 3% to 5%), whichever comes first.

Basic guidelines concerning densities for dry beach areas have been established and can also be found in **Ontario Provincial Parks: Landscape Design Principles and Guidelines**. They are as follows:

- low density 46 m^2 (500 sq.ft.)/person
- medium density 23 m^2 (250 sq.ft.)/person
- high density 9 m^2 (100 sq.ft.)/person

Parking should, of course, be located further back away from the water, out of the public use area and adequately buffered.

SEPARATION OF INCOMPATIBLE ACTIVITIES

The potential for conflict between different water-oriented recreation activities can detract from the safety and enjoyment of the waterfront. The resolution of conflict between boaters, swimmers and near-shore fishers can be particularly contentious when sites are small and competition intense among many users.

Furthermore, the operation of boats for recreational purposes remains virtually unrestricted, (i.e. licenses are not required to operate a boat unless it is in a federally regulated harbour) except for regulations which concern navigation, mechanical safety and the minimum equipment required.

However, under the Canada Shipping Act, a municipality can request that certain restrictions be imposed for the purpose of ensuring public safety. For example, boats can be banned from swimming areas and restrictions can be placed on water skiing and on the speed of boats. Applications to impose boating restriction regulations are made by the municipality to the Ontario Ministry of Natural Resources and are put into effect by a federal order-in-council. The only conditions are that the municipality must be responsible for the placing of signs and must demonstrate that the Ontario Provincial Police or the municipal police have been consulted and will enforce the regulations.

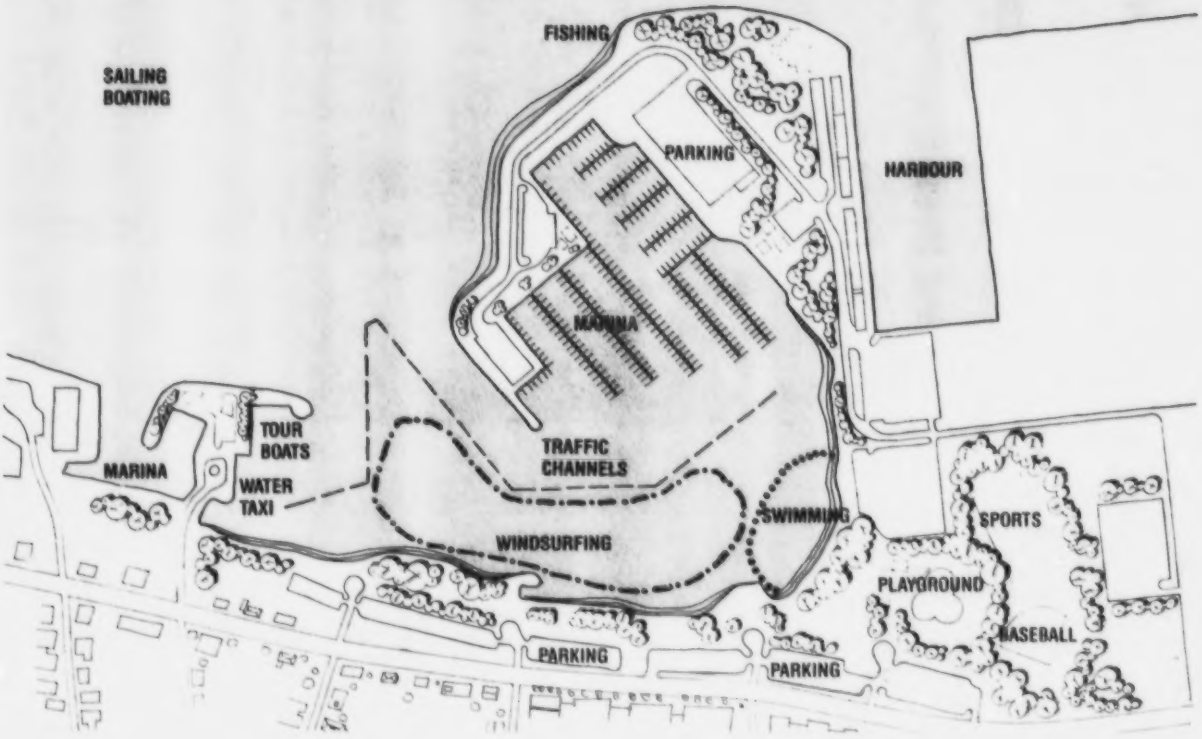
In order to further reduce possible conflict there should be a division of activities into groups which exhibit similar characteristics. Those activities which constitute a hazard to each other should be separated, for example, swimmers and boaters. Many potential problems, such as swimmers jumping off government docks where there is no rescue equipment, may be reduced by proper signage.

Another alternative might be the physical separation of activities by distance and the designation of shoreline activity areas. These areas could be designed in such a way that boat movements are limited to travel at right-angles to the shore, as far as this is practical. Where possible, a maximum speed of 8 kph (5 mph) could be established and boat movements could be restricted to approaches and departures from docks, launching ramps or beaches.[2]

If proper care is taken when planning waterfront activity areas, conflict can be avoided and all users will be able to enjoy the facilities in safety.

[2] For more information see: Ontario. Ministry of Natural Resources. **Boating Restriction Regulations, Ontario**.

Separation of incompatible activities



RECREATIONAL BOATING

To facilitate boating, municipalities must be able to attract and accommodate boaters and their needs. Facilities ranging from marinas to boat launch ramps will need to be provided.

MARINAS

Marinas either cater to local boaters who moor their boats on a seasonal or year-round basis, or to transient boaters who use the marina's facilities on a short-term basis. The needs of these two groups are quite different and, therefore, it is essential that the size of each group be established at an early stage when designing a marina facility.

The need for and size of marina facilities will vary according to the type of water system, that is, rivers compared to lakes. A day's cruise, however, is considered to be roughly 48 km (30 miles). The following are general guidelines for locating transient marinas.

- A principal marine centre should be located every 160 km (100 miles) or as justified. It would include all services necessary for boaters as well as a full range of other services, such as accommodation, restaurant and entertainment facilities.
- A major facility should be located every 80 km (50 miles) complete with engine and boat repairs and haul-out facilities in addition to first-class marina services.
- A minor facility should be located every 40 km (25 miles) with good docking and services and with minor mechanical and boat repairs and services.

The St. Lawrence marina in Brockville.

PROGRAMME/FACILITY REQUIREMENTS

Transient marina users rely on the boat as their main source of transportation while visiting an area. As a result, it is important that a marina which is aimed at the transient boaters' market be located within walking distance of needed services, such as downtown shopping and restaurants. They also need to have an available water supply, a 30 amp electrical service, larger docks and, often, deeper water. On the other hand, the success of a marina which is meant for use primarily by local boaters is not as dependent on a central location. Most users will travel by car to the marina requiring that the facility be easily accessible, have adequate parking facilities and be within a reasonable distance of marine services.

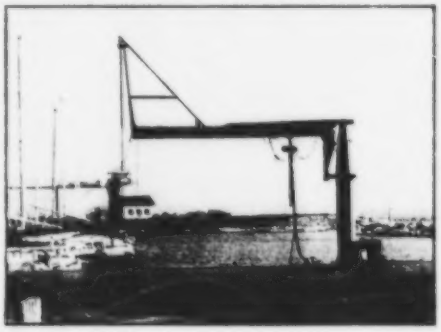
Each marina will differ depending on the market segment that is being catered to. On Lake Simcoe, for example, private marina operators tend to offer large covered berths which are rented to power boat owners for the entire year. Winter storage occupies the same berth as summer use. Sailboat owners use open slips in the summer but have need for winter storage areas. Small run-about power boats may be stored vertically in tiers of three and four boats and only put in the water on request. These different types of marinas and the corresponding facility development program will obviously have different land needs.

MARINA FACILITIES

- launching ramps
- crane lift
- docking (seasonal, monthly and transient)
- lounge area and/or club facility
- visitors' service building with washrooms and showers
- marina manager's office
- fuel service and tank areas
- boat storage (outdoors and indoors)
- sewage pump-out facilities (usually connected to municipal services) and electrical hook-ups
- marine supply store
- boat sales and repair facilities

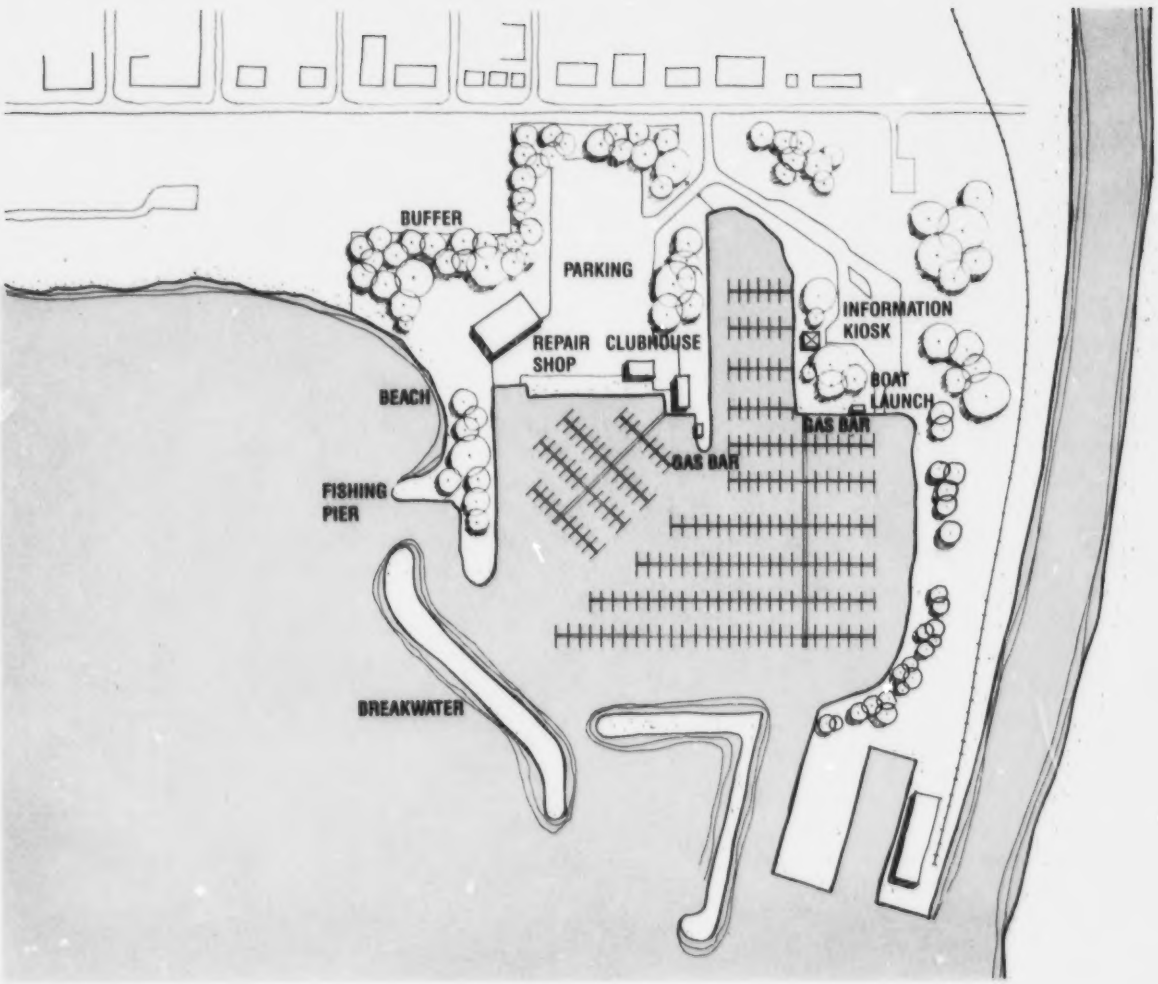
ACCESSORY SERVICES

- prepared food sales
- bait and tackle sales
- boat rentals
- water taxi services
- range of other boat related services



Marina accessory services in Kingston.

Marina concept plan



SPATIAL REQUIREMENTS

A well developed marina should be properly designed for safety, convenience, long life and reasonable cost. Before construction begins all potential craft sizes expected to use the marina should be accounted for. Generally, the number of transient slips provided should be one-quarter of the total number of boats to be accommodated on a seasonal basis. The average marina in Ontario handles about 100 boats. The approximate size of a marina can be established by estimating 111 to 139 square metres (1200 to 1500 square feet) of water area per boat and an equal area for land-based facilities.

Before any construction is started, it is important to prepare a concept plan for the marina keeping in mind possible future expansion, as well as its relation to the total waterfront development plan. Adherence to a concept plan will facilitate later development and avoid poorly located buildings and facilities. More specifically, the lay-out of the marina will depend upon the location and natural characteristics of the terrain. Actual site selection will depend on road or water access, proximity to the downtown, availability of land or waterlots, and the potential to accommodate on-shore facilities and parking.

Environmental considerations will also come into play in boat launch and marina designs. In general, a good location will have the following characteristics:

- shelter from prevailing winds and strong long shore currents
- minor sedimentation or erosion activities
- sufficient depth for potential boat-types (2.5 to 3 metres below chart datum)
- suitable backshore or backland for parking facilities.

Other considerations in marina site selection include:

- the compatibility of adjacent land-uses
- the range of services available
- flooding hazards
- climatic conditions including wind direction, wave direction and magnitude, and winter ice conditions
- environmental features such as fish and wildlife habitats.

Once the site is selected, the following should be considered:

- Design and layout of breakwaters to create a sheltered water basin with waves generally less than one foot in height. This will require detailed coastal and civil engineering design.
- Dredging and/or landfill requirements. This will include understanding soil conditions, setting limits on work, and determining the best construction methods to accomplish the objectives. Soil investigations may often be required.
- Layout and design of docking arrangements including spacing, fixed or floating dock systems, anchoring systems, connections to the shore area. Floating docks are generally preferred because of their ability to respond to changes in water level.
- The design of public access and circulation areas including visitor service centres, outdoor amenity zones, walkways and seating areas.
- Security requirements, access control points and operational methods should be determined in order to protect boats and private property. Generally, access to dock areas is restricted to boat owners and guests. Security measures may range from a passkey system to full-time supervision by paid attendants. Local situations and policies will vary.
- Layout and design of parking, vehicle circulation areas, service access and marina operation routes.
- Service and utility requirements including water, power and sewer systems.
- Landscape improvements including the creation of sheltered and shaded public use areas, buffering of undesirable views and the development of passive recreation areas.
- Appropriate navigational and dock lighting.

BOAT LAUNCH RAMPS

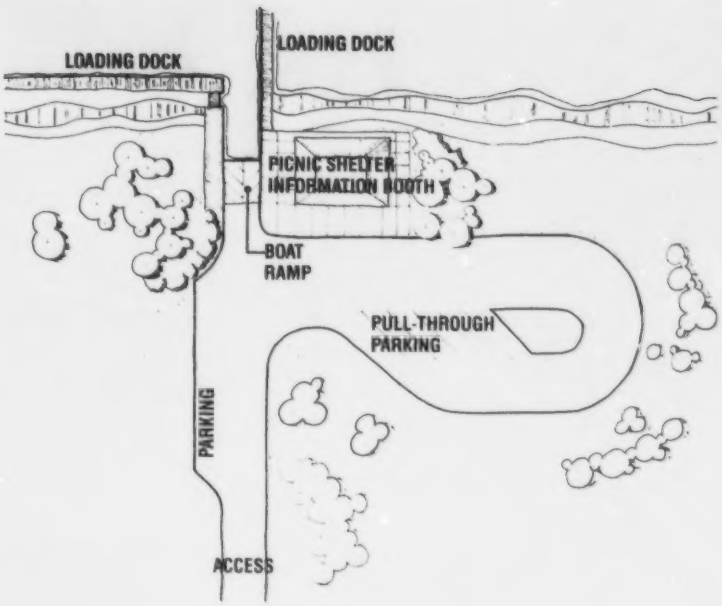
Well-designed and equipped boat launch areas which provide the motoring tourist, sportsman and local resident with access to the water system are important public facilities and may be located within a marina or independently. Often the boat launch ramp is one of the few undertakings a municipality will design on its own. Providing facilities for public boat launching, however, should be considered as more than merely building a launch ramp. Additional components such as adequate loading docks, a shelter, park area and information on local facilities could be developed. Washroom facilities should be provided at well-used boat launch sites. Particular attention should be paid to the circulation plan to assure an easy, and safe, access and waiting space for cars with boat trailers in tow.

Caution should be exercised in building a boat launch ramp if there is no one in the municipality qualified to design such a structure. If this is the case, outside expertise should be consulted to ensure that the facility is properly designed.

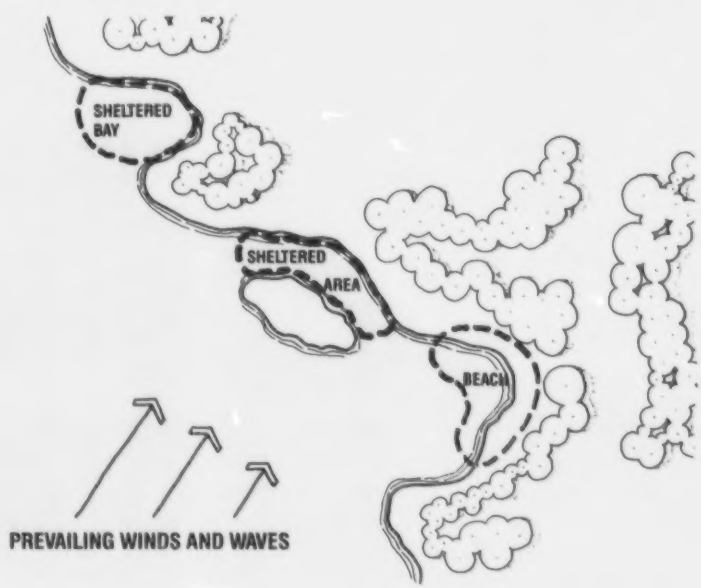
LAUNCH RAMPS

- A proper transition slope, between 10 and 15 percent, is required.
- Ramp surfaces should be "broomed" horizontally when poured to provide a non-skid surface.
- Ramps may be cast-in-place, pre-cast concrete or a combination of the two. (It is common to use pre-cast sections on a pre-formed under-water base and cast-in-place concrete above the water surface).
- Pre-cast sections may be either a slab type or a plank type. Planks are usually 102 mm (4 in.) thick, about 381 mm (15 in.) wide and 3m (10 ft.) in length. Some means of plank linkage is usually provided by casting a perforated steel strap or steel eye-bolt near each end. Gaps between planks should be about 76 mm (3 in.). A minimum width of 4m (14 ft.) should be allowed for the ramp with the length depending on the depth and fluctuation of the water level.
- Where deep water is encountered off shore, it may be necessary to support the ramp with log pilings. In this case, wooden ramp construction is recommended, using cedar or hemlock. As wood ramps tend to become slippery, installation of a cleated catwalk along each side of the ramp may prevent injury. Other alternatives are discussed in Ministry of Tourism and Recreation, **Marinas: A Guide for the Development and Operation of Recreational Boating Facilities**.

Boat launch ramp



Boat launch and docking: site selection



LANDSCAPING THE WATERFRONT

Landscaping with appropriate plant materials, paving and furniture will contribute to the attractiveness of the waterfront. Such improvements can also assist in unifying the overall development, connecting the waterfront to other areas of the community and modifying the microclimate to make the waterfront a more pleasant place to be.

PLANT SELECTION AND PLACEMENT

Water and ice can damage plants. Planting, therefore, should not be too close to the water's edge, and then only hardy materials (preferably indigenous) should be selected. Plant materials geared to a colder climate zone should be seriously considered for the water's edge. In addition, the plants should be able to withstand compacted soils and a high water table. In some areas, such as where landfill has been used, toxicity might be a problem and should be taken into account. In all cases, the type of soil and climatic conditions will dictate what can successfully be planted. When planting on the waterfront, younger trees will adjust better to adverse conditions, such as wind, and produce results sooner. Younger trees will also be cheaper. Fast growing trees tend to be weak-wooded, presenting problems such as fallen limbs. Therefore, they should be avoided, except when they are used to produce a quick screen while hardier trees are growing. Planting of shrubs can attract numerous species of songbird.

When long distances or large waterfront areas are involved, it might be appropriate to use landscaping materials strategically throughout the development. For example, a special plant species, paving material or form of signage might be used at appropriate intersections.

Proper landscaping makes a major contribution to the attractiveness of an area.

Other aesthetic improvements can be brought about through the use of plants and natural materials:

- Vegetation and berming can soften a building's edge, or camouflage parking lots or unsightly land-uses.
- Planting can also define certain areas, create a sense of place, direct circulation (through row planting) and create a barrier.
- Tree canopies can improve the transition between indoors and outdoors.
- The use of boulders where they naturally appear along the water's edge, can reinforce the water theme.

Waterfront landscaping in Sault Ste. Marie.

CLIMATE MITIGATION

The interaction of air and water makes the waterfront slightly warmer in winter and cooler in summer. During the spring and fall seasons, however, the winds sometimes push the temperatures below the comfort range. Landscaping can be effective in overcoming the microclimatic limitations to extend comfortable use of the outdoors.

Trees and shrubs, particularly, can be used:

- to block wind in order to prevent it from interfering with either passive or active uses of space
- to channel winds (for cooling breezes in summer or to blow snow away in winter)
- to hold the warmer air near the ground, thereby extending the comfortable hours of the day.

The terrain itself may also serve as a windbreak, since elevation changes tend to reduce velocities. Berming is an effective way for controlling winds and tends to interfere less with views than the use of trees or shrubs.

Because of the potential conflict between blocking winds and preserving views even the most minimal windbreak plantings, such as a row of coniferous trees, must be carefully considered and executed. A solid barrier creates excessive turbulence and is costly to build, which is why plant materials are preferred. Deciduous trees are effective along urban waterfronts because, in addition to blocking some wind, they trap warm air beneath, and allow views below the canopy.

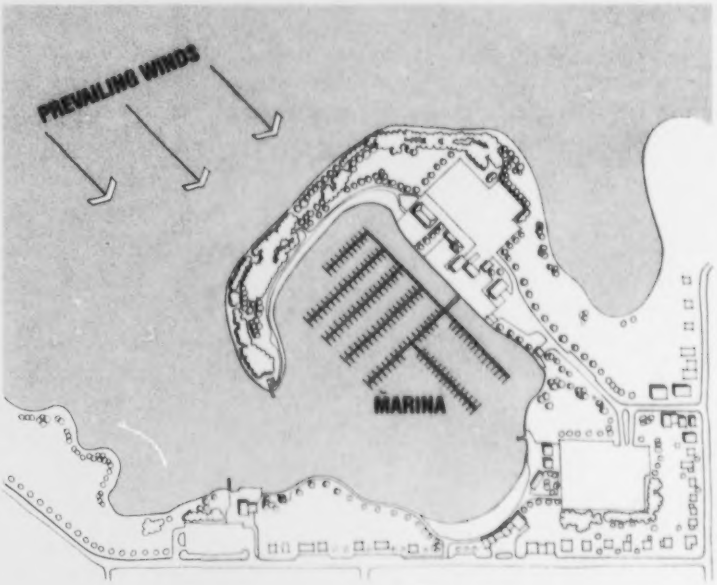
Trees can also be used to create shade during those periods when cooling is desired. Shade planting along the waterfront will probably be needed only where a protected seating area is being provided. However, caution should be observed when planting for shade as well as wind. Plant materials can cast long shadows in winter and transform spaces into cold, uninviting areas.

Particular attention should be paid to the use of coniferous trees. They are excellent for blocking wind but tend to cut out too much light in the winter when the sun is low and the sun's rays most desired. This is also true for heavy-limbed deciduous trees. Trees that lose leaves early in fall and are late in starting growth in spring provide the best potential for summer shade, without losing the sun during cooler periods.

Plexiglass screens may also be used and offer the advantage of not obstructing the view. However, like a solid barrier, they create turbulence. It is best to use them in a small area, such as an outdoor restaurant patio.

The use of appropriate paving materials can also be effective in microclimate control. Water creates a lot of reflection and combined with sand, snow and/or sun, the waterfront can be a very reflective environment, creating a glare problem. Again, because the waterfront tends to be cool, the sun's warmth and rays should generally be absorbed. Darker colours and absorptive materials, such as clay or brick, are better than the more reflective, lighter colours and materials in attracting sunlight.

Climate mitigation



URBAN DESIGN

There are a number of design considerations which will commonly arise when preparing a waterfront plan:

- how to plan for mixed use waterfronts and ensure that activities are compatible
- how to create waterfront focal points
- how to keep a human scale
- how to create topographic interest
- how to incorporate the existing flavour of the community into new developments
- how to develop character, and create interest and attraction, in an area
- how to design the area to be safe and convenient.

MIXED USE AND COMPATIBILITY

Most waterfronts have a mix of uses and most need a mix of activities to ensure an interesting environment which appeals to a variety of users. Places of work help to give a feeling of vitality to a waterfront and also provide focal points for visitors, in addition to commercial and leisure-oriented activities. Also present may be certain industrial uses which, although noxious and even dangerous, may be unrealistic to relocate. Pulp and paper mills or steel works, for instance, are often the mainstay of a community and it would be impractical to suggest that they be moved.

Bringing different uses together may have drawbacks. Conflicts can take place when:

- there is competition for space (e.g. parking)
- the safety or enjoyment of the users is jeopardized by contact with industries, traffic, etc.
- industries cannot operate effectively because of the users of other facilities
- passive and active uses are located too close to one another
- the users are from different age groups.

Some ways of resolving these problems are:

- the creation of buffer zones with good landscaping
- clear signage

At Collingwood, a marina is located next to a grain elevator.

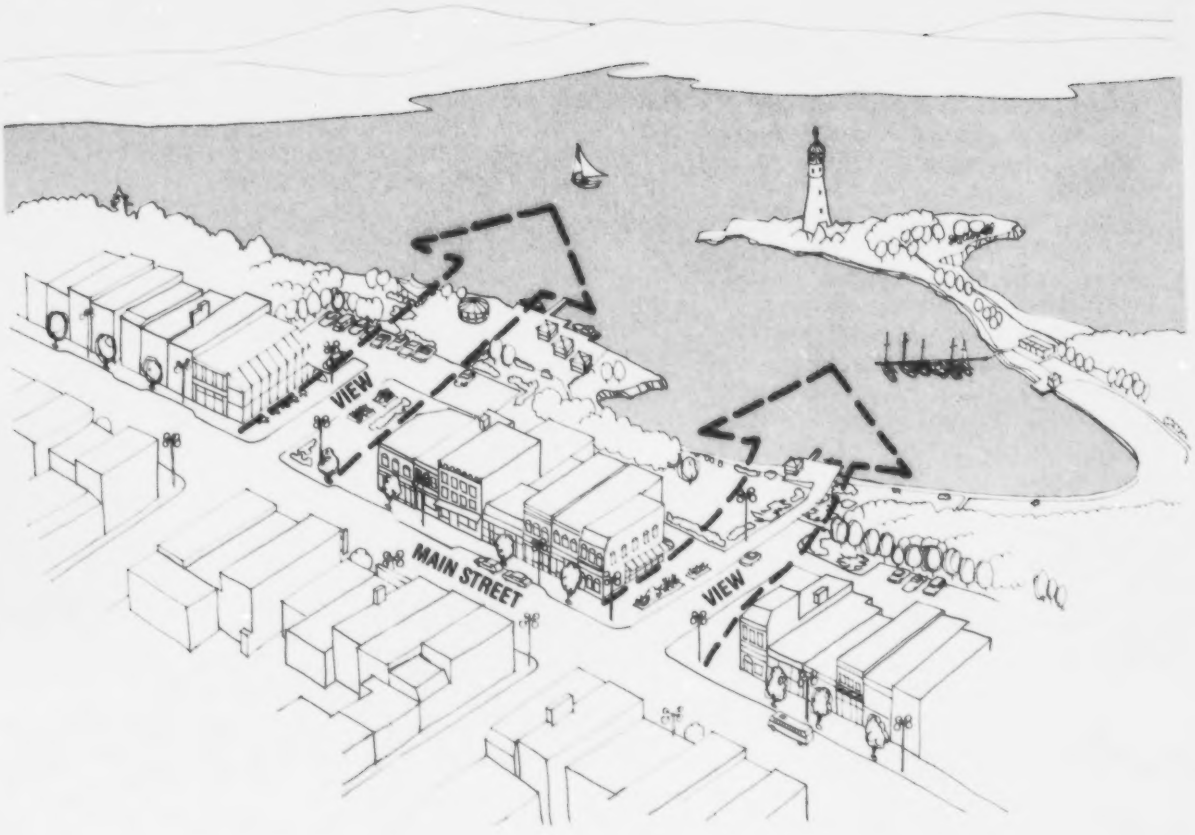
- development upwind of industries
- adequate distances between uses
- development of complimentary uses
- well thought out parking schemes
- well thought out road networks.

Where certain activities are located in a people-oriented space, buffers are not always the best solution. Sometimes a simple clean-up and aesthetic improvements are the answer. Industrial uses, if not noxious or noisy, do not always need to be screened. A mix of two or three different land uses is recommended as it provides a more extensive and more variable use of the land.

WATERFRONT FOCAL POINTS

The same philosophy of creating anchor stores in a shopping centre applies to waterfront development. Anchors, such as a major restaurant, sports facility, marina or lighthouse, are essential for attracting users to, and drawing them along the waterfront. If a waterfront is simply a combination of uses of equal intensity, no destination will become important and lend identity to the waterfront. Kingston's waterfront is an example where hotels and a transient marina have been combined on the waterfront to create tourist anchors adjacent to the downtown. As well, the bridge in Cambridge acts as a visual focal point and destination for pedestrians using the river corridor.

Waterfront views



HUMAN SCALE

Although it is essential to have sufficient development to attract and retain users on the waterfront, it is also important that, in most instances, development be at a human scale.

The use of awnings, colours and consistent signage all add qualities to a development that translate into a people-oriented space. Buildings with recesses which create nooks and crannies for sunny seating areas, not only create a better outdoor environment but also appear to be smaller scale. The more intimate the scale, the more inviting the space, especially to visitors.

VIEWS

Part of what makes an urban waterfront exciting and different from the rest of the urban community is the contrast between the built environment and the water. The visual and physical relationship is extremely important and views should be respected in any type of development and in the waterfront plan.

Along rivers or canals, for example, there is a strong visual connection from one side of the river to the other. Development on one side may detract from or enhance a project on the other side. A parking lot on one canal bank, for example, may detract from a restaurant located on the other side, while open space or a residential building would provide an attractive view.

A lakefront may provide a continuous view, depending upon whether the waterbody forms a bay or has islands which enclose it. Elements such as ferry

buildings, marinas, ship repair facilities and even grain elevators, stimulate interest in the waterfront. These structures serve as landmarks or physical points of reference which help to make cities and waterfronts more uniquely identifiable.

Roadways which end at the waterfront offer the potential for good views to and from the water. This is important if a community is enhancing its tourism potential with waterfront development. At these points, outdoor nodes could be created so that the waterfront may be enjoyed by foot or from the car. New buildings should not block the vista.

Many communities also have waterside roads. These routes parallel to the waterfront also offer views, but only when there is not continuous development along the water's edge. Even when development is sporadic, it may be difficult to benefit from the views. Waterfront plans can seek to protect/preserve views or vistas as important natural or historical features.

HERITAGE PROPERTIES AND EXISTING FEATURES

Each community has its own flavour and should capitalize on its assets. What works in one setting does not necessarily work in another. Just as preserving views and view corridors is important, so is the incorporation of the community's existing characteristics and flavour into the waterfront plan. Often the waterfront is the oldest part of the city and buildings of heritage value may still remain. Those usually associated with the waterfront are warehouses and mills. There are a growing number of restored buildings on Ontario's waterfronts which capitalize on both heritage and a waterfront location. The combination of the two creates a powerful attraction. In Belleville, a warehouse on the waterfront was renovated for reuse as part of a marina development. The building now houses showers, laundry facilities, customs offices and recreational facilities.

Buildings such as mills, factories and warehouses can lend not only authenticity to the waterfront, but also clues as to how the original waterfront might have looked. They serve as a link with the past and are extremely important in establishing a sense of place, as well as providing an additional drawing card for the waterfront. Heritage remnants such as ferry buildings, lighthouses and forts can also provide an appropriate design theme or flavour. Kingston's use of the fort theme (relating to Fort Henry) for washrooms and amenity buildings is a case in point. Similarly, the use of local building materials, such as the use of stone in Cambridge, can be effective in contributing to the sense of identity.

CHARACTER AND INTEREST

By their very nature, most waterfronts are attractive. However, they could be made even more attractive to tourists and community residents. For example, the character of the waterfront could be enhanced through interesting topography, landscaping, architecture (with consideration for human scale), historic features and views. The addition of active recreational uses such as amphitheatres, skating and roller skating rinks, wading pools and tot lots will create a special interest in the waterfront as an active use area. Gazebos, sculptures and exhibition space may also be a good addition.

Comprehensive and coordinated design, in terms of colours, materials and style, of all the above items, is essential to achieve a pleasant, tasteful and attractive character.

SAFETY AND CONVENIENCE

Adequate lighting and the unobstructed view of public areas are essential safety features. Properly designed landscaping, walkways, furniture and stairway or ramp railings are also important.

Easy pedestrian access (unobstructed and well lit walkways or controlled pedestrian crosswalks) is one of the key convenience features. Vehicular access (both for automobiles and bicycles), in terms of easy circulation and adequate parking, also adds to the convenience of the area. Other features such as rest stops and areas protected from excessive wind (typical for waterfronts) or rain should also be considered.

5.

WATERFRONT PROJECTS

This chapter looks at examples of different waterfront projects that have been undertaken in Ontario. Seeing what other communities have done will, hopefully, be useful to those municipalities who are just beginning to think about the best way to develop their own waterfront areas. Some general guidelines will be given on how to tackle different types of development. Aspects such as, concerns for the environment, project location and access, the market, etc. will be examined.

RECREATIONAL BOATING

In Ontario, one out of every eight residents owns a boat and the waterfront is an important source of their enjoyment. Marinas and ancillary developments can be important initiatives. They provide the municipality with an opportunity to enhance its drawing power and tap into the $2.5 billion recreational boating sector of tourism in Ontario. This sector directly produced 27,000 person-years of employment in 1985. From these 27,000 person-years, the direct and indirect employment is estimated at 47,800 person-years (Small Craft Harbours Branch, 1985). The spin-off employment arising from job-holders spending their paychecks locally should be added when

assessing the full impact of boating as a major revenue producer for waterfront communities.

A waterfront development programme could add significantly to a municipality's economic base. Two examples of the successful use of recreational boating as a generator to improve the local economy are the Village of Bayfield and the Town of Little Current.

The Village of Bayfield, located at the mouth of the Bayfield River along Lake Huron, is an important boating and recreation centre along the Lake's east shore. Its present population is 650, but swells to more than double this number over the summer season.

Recreational boating in Bayfield has grown steadily over the past decade. Improvements to the facilities have paid off in a higher level of seasonal slip occupancy and increased boater spending. It is estimated that boaters spent $2.6 million in Bayfield in 1984 and that the income generated to regional residents was $4 million. The result has been the creation of approximately 35 full-time jobs as well as spin-offs in boat building in the area.

Little Current, population 1,500, is the auto link to the mainland from Manitoulin Island and functions as a shopping and service centre for tourists over a significant area of the Island. Since 1972 Small Craft Harbours Branch has spent $1.5 million on construction of a marina, and repair and maintenance of the main town wharf. Around 30 full-time jobs have been created as a direct result of recreational boating.

The building of a marina may be the first major investment that will be undertaken as part of a waterfront redevelopment project. This may be carried out completely by the municipality, it may be a joint public/private initiative or it may be a completely private development. Some examples of different marina projects that have been undertaken in Ontario are described below.

The Town Dock at Midland, on Georgian Bay, was built with a combination of federal, provincial and municipal funding as well as contributions from the Midland Harbour Committee and the Midland Rotary Club. It has 72 slips for seasonal boaters as well as commercial tours and charter operations. There is a 120 metre servicing dock, a gift shop, a restaurant, washrooms and marine offices.

Waterfront improvements in Little Current.

The Brighton marina.

The Wye Heritage Marina in Tay Township has 1000 slips and was built with a combination of public and private funding. The amenities include washrooms and showers, a clubhouse, a store, storage buildings, boat lifts, marine repair services and many others.

Marinas can significantly enhance the marketability of a municipality and its waterfront. Without sufficient marina and supporting facilities, e.g. restaurants and shops, a municipality may be losing significant tourist dollars that recreational boaters spend each year. For a municipality that is attempting to market its waterfront on its tourism attributes, there are obvious benefits to be derived from providing these facilities.

HOUSING

When developing residential uses and facilities on the waterfront, as with most other types of development, prime consideration should be given to the problem of access and also to ways of preserving views. Residential uses also need careful planning in terms of meeting general waterfront development goals.

The qualities attributed to good housing, such as privacy and security, can be incompatible with other goals, such as public accessibility. In addition, because of the new value placed on waterfront property, housing tends to be expensive, generally making it available only to higher income groups. Associated with higher land costs is the need for higher densities to offset this. Higher densities in turn dictate either high rise, or medium density development, both of which can cut off views and access to the waterfront. High densities also necessitate the need for more parking which further takes up valuable waterfront space.

Ontario has seen a proliferation of new residential development on the waterfront, ranging from high-rise buildings in Kingston, Brockville and Belleville, to mid-rise development in St. Catharines and townhouses in Sarnia.

The Anchorage in Belleville.

Objectives that should be kept in mind when developing housing on the waterfront are:

- creating separation between private and public space (e.g. a grade change or a screen of vegetation)
- setting the buildings back from the waterfront
- providing public access along the water's edge
- siting the buildings to offer views of the waterfront
- protection against flooding and erosion.

The problem of maintaining views and access for the larger community becomes more difficult when housing and boat mooring are provided together. Because public access should be restricted to provide adequate security for boats, the walkway usually goes behind the development, depriving the public of waterfront access. In this case, an alternative to the continuous walkway could be provided, in the form of platforms which project out into the water and offer generous views.

Residential development requires parking for residents and visitors. Since waterfronts tend to be located in areas with high water tables, underground parking may not be possible. On the other hand, on-grade parking spaces would occupy a large area of waterfront land, which would be undesirable. Parking, then, should be tucked behind the units on the land side and not occupy prime public-use space. Parking should also be well screened. In some cases, it may be possible to locate tennis courts or other uses above on-grade parking, if desired.

SHOPS, OFFICES, HOTELS, RESTAURANTS

Commercial uses can serve as an important draw or anchor on the waterfront. Restaurants and retail stores can be best supported if they occur in areas of concentrated activity. Offices, for example, supply a market for the other establishments on the waterfront. In addition, they ensure year-round use and constant day-time activity in the area. If commercial uses are planned for the waterfront, a mix of retail, office and service establishments is generally essential.

A waterfront motel in Kenora.

Waterfronts are also an excellent location for hotels. Lodgings close to waterfront activities, with good views, are extremely popular with both business travellers and tourists. In addition, hotels supply a built-in market for restaurants and bars and other facilities on the waterfront. Kingston's waterfront plan called for new hotels on the waterfront adjacent to the downtown and, to date, three have been constructed, providing sound support for nearby retailers and creating anchors to draw people to the water.

Users of all the preceding types of development can benefit from the proximity to waterfront parks, open spaces and activity areas. Retail outlets selling food and other supplies are also essential services for marinas.

Port Dalhousie, in the City of St. Catharines, has experienced improvements to its waterfront through the efforts of many different parties. In 1984 the City, with the assistance of Small Craft Harbours Branch of the Federal Government, developed a Harbour Plan which proposes improvements to docks and parking. These will compliment earlier investments by the private sector. Private investment includes a restaurant renovation, boutiques and, in the future, shops and a motel.

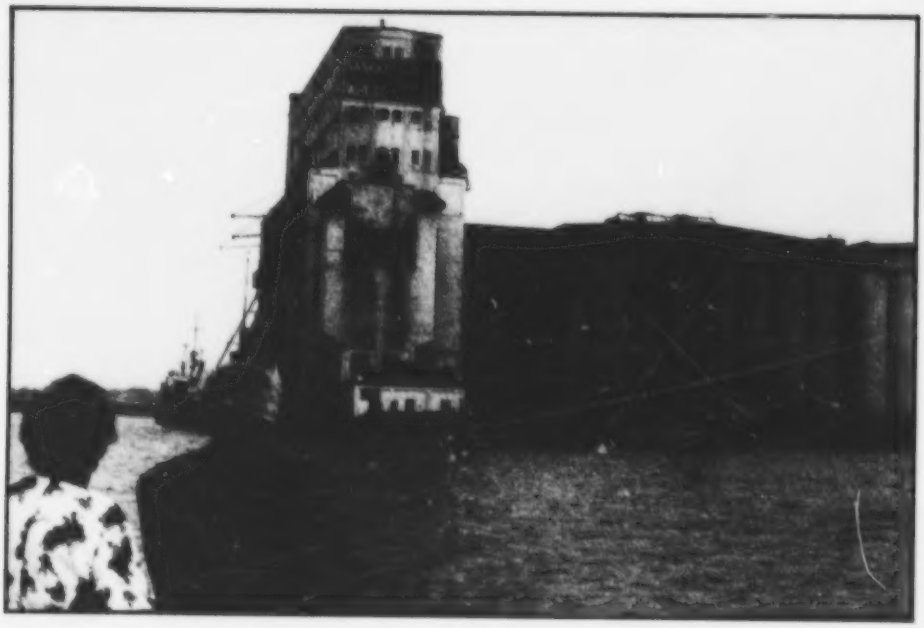
In 1983-84 Small Craft Harbours Branch, along with the City of Belleville and the BILD programme, contributed to a Special Capital Recovery Project for docking and building renovation in the City. BILD funds were also committed to a hotel/commercial complex. However, private sector development had actually preceded the public involvement and a number of new developments, such as a fitness centre and the construction of new townhouses, have taken place since.

INDUSTRIES

For many municipalities their waterfront lands are prime industrial locations, serving not only the local community, but also the whole region. In cases where industries are a well established and legitimate land use, making significant contributions to the local and the regional economy, the municipality should be concerned that any waterfront redevelopment does not unduly disrupt their activities.

Ontario has several ports along the Great Lakes which have undergone changes to accommodate containerization. Sault Ste. Marie, Thunder Bay and Parry Sound are examples. This type of transformation has dramatically altered the waterfront and isolated it from mainstream waterfront activity. Whereas, in the past, there used to be a clear harmony and identification between ports and cities, now there are psychological and physical barriers. However, even without containerization, the industrial environments along Ontario's waterfronts have undergone changes. Railroad lines are often no longer needed, and have sometimes been abandoned; trucking has become much more important. Similarly, oil storage tanks are often no longer in use, as is the case with many grain elevators and warehouses. Sometimes these abandoned facilities can be removed. Often, considerable land is underutilized and available for redevelopment for industrial and other uses.

Extensive development has taken place on Belleville's waterfront.



Ship docked at the grain elevators in Thunder Bay.

Basically, there are three issues associated with industrial development on the waterfront which require physical resolution. Either the industrial buildings remain and are buffered or integrated into the development, or they are abandoned and/or relocated and a new use found. The third possibility, that new industry will be located on the waterfront, is a fairly rare occurrence.

Some industrial uses may pollute, cut off access and block views, but they provide the economic stability of the community. Relocation, except in a few cases, is out of the question. Mills, grain elevators, container ports, etc. require sensible siting of new adjacent development. Consideration should be given to the following when developing next to industrial areas:

- buffering from lights and noise, by the use of berms or vegetation
- direction of prevailing winds
- airborne and waterborne pollutants
- problems of parking on and access to the site.

These factors also have implications for water-related and land-based industrial uses.

Where redevelopment of industrial lands will not occur, it may still be possible, with cooperation from industries and a positive approach, to make many of these areas more attractive by landscaping. It may also be possible to allow a degree of public access. There is no reason why a bike path or a park cannot be located adjacent to a large industrial plant, if the proper safety precautions are taken. For example, the bike path along the Toronto waterfront passes through and alongside many different types of industrial activity.

Closer contact with a working port or industry, such as the commercial fishing operation at Port Dover, can be an important attraction for the public and contribute toward a better understanding of the port with respect to the regional economy. Windows to the port can be created in many ways. A small park with fishing pier and observation points could be created adjacent to an interesting viewing area. Walkways along the water-

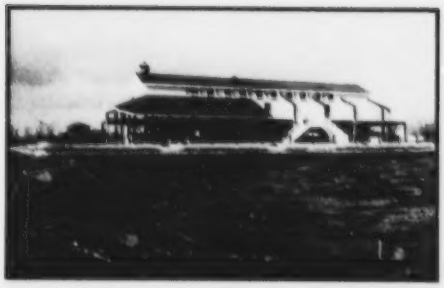
Incubator building for new small business in Gore Bay.

front could be used and/or would also permit exposure. Access by weekly boat tours is another possible way to increase public awareness of the working waterfront.

If new industry is being considered for the waterfront, guidelines can be set out at the planning stage to ensure that conflicts with other waterfront activities are minimized and that as much access to the waterfront as possible is maintained.

Many former industrial buildings are suitable for re-use and Ontario has some good examples of where this has occurred:

- In Belleville the Harbour Club was developed in an abandoned warehouse which was retrofitted with a pool, squash courts, restaurant, etc.
- The Old Mill restaurant in Cambridge is also an example of what can be done with abandoned industrial buildings.
- In Port Dalhousie a former ship chandlery, which had been abandoned for 40 years, was renovated for boutique uses.



The Harbour Club in Belleville.

WATER AND SEWAGE TREATMENT PLANTS

Like some industrial uses, water and sewage treatment plants are generally located along the waterfront and are there to stay. These land uses have special implications for water-related activities. Swimming, for instance, should be located far away from them. Buffering and adequate separation distances may have to be carefully considered when developing on land near or adjacent to these uses.

However, these plants may also facilitate some activities, such as fishing in winter, as is the case in Sarnia. Jack Darling Park in Mississauga has been constructed over a major water treatment facility. In other instances, the facility itself may become a waterfront attraction and tours may be given to students or interested members of the general public.

CITY HALLS, HOSPITALS, SCHOOLS, MUSEUMS

Planning for new or renovated public buildings on the waterfront is an ideal way to attract people to the area. These buildings can often act as a focal point for new development. In addition, they will indicate to the private sector that the municipality has faith in its own decisions and is prepared to locate or renovate its own buildings in the area.

Waterfronts are often the oldest parts of cities and sometimes the buildings and facilities in these areas lend themselves to re-use as public facilities.

The Pump House Steam Museum in Kingston.

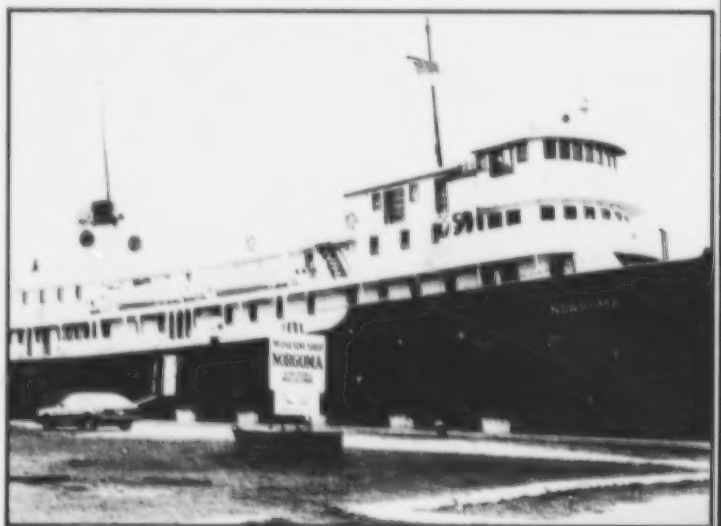
Museums, interpretation centres or tourist information offices, have been successfully located in abandoned or unused industrial or commercial buildings and even boats. Kingston's Pump-House Steam Museum is such an example.

Many people-oriented institutional uses abound on Ontario waterfronts, taking advantage of an often pastoral setting. Peterborough's Trent University is sited on the banks of the Otonabee River. In London, a courthouse building (now county building) sits on the edge of the Thames River. Across from this building the new London Art Gallery has been built, providing a view to the forks of the river where the city originally developed. The stadium was also placed on the waterfront across the river from the gallery.

If some public buildings such as prisons, for example, are unsightly and of an inappropriate scale to blend in with new development, they may be buffered or landscaped and treated in a similar manner to industrial uses which have a negative impact. Other forms of institutional use on the waterfront, such as hospitals and schools, may offer the potential for improving public access to the water's edge or expanded recreational opportunities, such as jogging/bicycle paths.

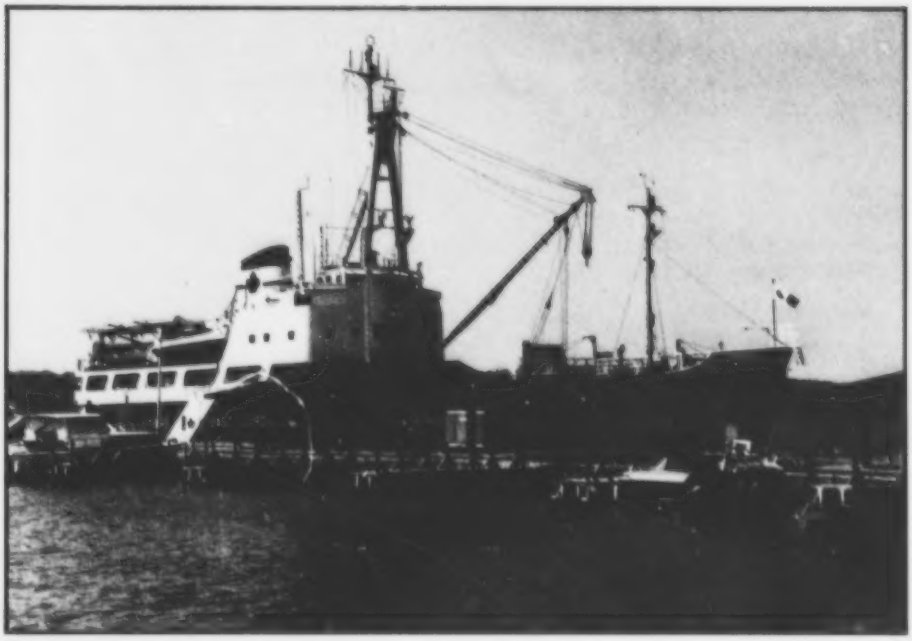
Other existing waterfront facilities lend themselves to tourist-related uses. Aqueducts, canals, locks, docks, harbours, lighthouses, bridges, etc. are examples of places and structures of archaeological interest for museums and interpretation centres. Waterfront forts frequently act as an important focal point for development with an historical theme.

A great many new institutional uses are being proposed for the waterfront ranging from aquariums (Burlington) to a crystal palace, (Hamilton) a performing Arts Centre, (Sarnia) and a telecommunications museum (Brantford). Like commercial ventures, these uses should serve an important function by offering year round destinations on the waterfront. They should, of course, also follow the same guidelines for accommodating public access and preserving views.



In Sault Ste. Marie, the Norgoma has become a tourist attraction.

APPENDICES



EXAMPLES OF PROGRAMMING

The following communities are presented as providing examples of programming for waterfront activities in smaller Ontario communities.

NORTH BAY'S WINTER CARNIVAL

North Bay, a community of 51,000 people, has hosted a winter carnival on the waterfront for the past four years. The carnival takes place towards the end of February and is organized by a volunteer group comprised of members of the various service clubs. The intent is to raise money for these groups, which in turn put it back into the community. The City contributes about $6,000 to this annual event.

Highlights:

- Caps and buttons allow admission to pubs in service clubs.
- Most activities take place on the waterfront — soon to be moved to a new waterfront area being developed.

Features:
- slide hills
- hayrides, pony rides
- all terrain vehicle rides
- a bocce tournament
- horseshoe tournament
- lumber jack tournament
- snowmobile racing
- sky divers
- ultra-light aircraft
- radio controlled model aircraft
- cross-country ski loppet on ice
- Re-max and Labatt's hot air balloons
- a snow-worm contest
- a skating rink

Attendance at the winter carnival is estimated at 8,000 people/day. Approximately 3,000 come to North Bay for the event and occupy all the hotel rooms to capacity.

BARRIE'S KEMPENFEST

Barrie's Kempenfest, a summer festival, has been held along the Barrie waterfront at Centennial Park for at least the last ten years. The event takes place over the civic holiday week-end during the first week in August.

Highlights:
- Festival is operated by service organizations.
- Advisory committee is involved in co-ordinating and advertising.
- Service organizations are levied at a rate between $100 and $950 to cover costs.
- Any profits are put back into the community.
- Main attractions take place at Centennial Park, but other events are programmed for ancillary locations throughout the city with a shuttle bus service linking the main events.

Features:
- water show
- arts and craft show
- chicken barbecue
- an amusement park
- beer garden
- dog show in nearby Molson Park
- steam engine show at the fairgrounds

It is estimated that between 40-50,000 people attend the Kempenfest over the weekend. In addition to the Kempenfest, Barrie held its bicentennial celebration on the waterfront and will continue to celebrate annually with a heritage festival.

MIDLAND "VISITOR'S PASSPORT"

During the summer of 1984, the Midland Harbour Committee conducted a survey of boaters who used the Town Dock. The number of registered transient crafts utilizing the facility that summer was 1,154. The average expenditure of those boaters who were surveyed was $250 per stay.

During the summer of 1985, the town promoted the Midland harbour and the downtown business core by distributing from the Harbour Master's office to the transient boaters, a "Visitor's Passport". These passports were developed by the Midland Harbour Committee and the B.I.A. The printing costs were recouped from advertising in the brochure. The Harbour Committee also provides complimentary copies of the local newspaper so visitors can find out about events and attractions in the Midland area.

The Passport provides a map of the downtown core showing essential services geared to tourist's interests and coupons redeemable for up to 15 per cent off purchases from local businesses.

OWEN SOUND'S KELSO PARK AMPHITHEATRE

Owen Sound is a City of 20,000 people located where the Sydenham River enters Georgian Bay. Until the 1960's the harbour was used for industrial purposes only. A waterfront plan was prepared in the 1970's and the municipality began acquiring land. One of the first projects was the Kelso Park Amphitheatre, built in 1981. A part of Kelso Beach Park, the project was funded by the City with Neighbourhood Improvement Program and Ontario Neighbourhood Improvement Program funds.

Highlights:

- A park which contains an amphitheatre was completed for $400,000.
- The Amphitheatre ($300,000) was built to accommodate the Owen Sound Summer Folk Society (it was expected that other shows would use the facility).
- The Folk Society contributed volunteer labour toward the amphitheatre to assist with some of the hard services, such as hydro installations.
- Arts and crafts areas are set up in the park.
- Three day attendance at the festival approaches 15,000 people.
- The festival could attract larger audiences, but is limited by the amount of parking and hotel spaces.
- The City recognizes that a conflict exists between closing the park off for private use and providing public access.
- The Amphitheatre has been instrumental in changing people's attitudes towards the waterfront.
- The amphitheatre has acted as an excellent starter project.

COSTS OF WATERFRONT IMPROVEMENTS

A number of key expenditures must be considered before any significant waterfront development can begin. The most important and costly of these are for physical restraints, including breakwaters, bank stabilization and shorewalls. Other costly yet necessary expenditures are for parking lot development and landscaping.

Along with these initial capital costs, all waterfront developments require regular reinvestments of money for maintenance and operation. In general, higher priced stabilization measures have lower long-term maintenance costs. In addition, the on-going costs associated with parks, beaches, bike paths, play areas etc. must be taken into account early in the planning process.

Marina costs can also be a significant part of the waterfront redevelopment. The costs of marina construction will vary throughout the Province, however, certain ones (excluding marina engineering construction costs) can be estimated (in 1981 dollars) and are as follows:

Seawall and Bulkhead Construction		$150-300/foot
Docks		fixed $650/dock
		floating $100/foot
Piles		$150-200/pile
Paving		$1,300/sq. yd.
Buildings	Metal Storage	from $20/sq. ft.
	Main Marina building (pre-fab)	from $18-23/sq. ft.
	Main Marina building (masonry)	from $35/sq. ft.
Water System		$400 per berth
Sewage System for 100 berth marina		about $10-15,000
Electrical System		$500 per berth
Launching Ramp		$ 5,000-$20,000

Public phones (Bell Can. 1-800-268-5933)	No Cost
Washrooms (including shower)	$ 4,000-12,000
Laundry	$ 4,500- 6,000
Winter Storage Building per boat	$ 1,000- 2,000
Pump out (with municipal hook-up)	$ 7,000-20,000
Pump out (without municipal hook-up)	$12,000-25,000
Fuel pump	$10,000-15,000

Source: MNR **Marinas** p. 31

ORILLIA

Orillia is a community of 24,000 people located on Lake Couchiching which is part of the Trent/Severn Waterway. It has the potential to be a major centre for summer tourist traffic because of its location on the waterfront and also the surrounding concentration of summer cottages and outdoor recreation facilities. The waterfront is located at the foot of the city's main business street, but its potential was constrained due to access and landownership limitations. The planning phase of the waterfront development process culminated in long and short term programmes for the development of municipally owned waterfront lands.

The short term development programme resulted in a concept for a municipal transient marina, a public fishing pier, improved park facilities, improved vehicular access, and pedestrian integration of the waterfront with the recently improved main street. The waterfront project was opened for public use in June, 1985 and the costs were as follows:

Clearing site	$ 14,400
Sheet pile wall	291,217
Sheet pile anchors	74,188
Backfill	35,065
Imported backfill	16,758
Launching ramp	25,700
Boardwalk .75 m	1,749
1.50 m	4,090
3.0 m	35,280
4.5 m	9,650
5.0 m	23,265
Concrete paving plaza	107,402
Parking	94,417
Earth borrow	19,194
Concrete planter wall	19,868
Concrete steps	4,460
Shelter building	9,870
Pump out station	5,800
Shuffleboard court	4,950
610 mm sewer adjustment	2,500 ea.
760 m " "	2,650 ea.
1220 m " "	4,025 ea.
1370 m " "	3,500 ea.
1525 m " "	4,450 ea.
Water services	8,200
Electrical services	101,050
Catch basin	640
Catch basin and connection	1,960
landscaping	244,550

A breakwater 520 metres long with a 40 metre wide central entrance was also constructed. This was funded under the federal Special Recovery Capital Projects programme and the costs were as follows:

0-450 mm rock core	63,314 tonnes at 7.15	$452,695.10
150-450 mm rock rip-rap	10,148.2 tonnes at 7.65	77,633.73
Breakwater Lighting and Nav-Aid System	11 fixtures	59,640.00
	Sub-Total	$589,968.83
Engineering and Inspection		17,300.00
		$607,268.83

BROCKVILLE

In conjunction with harbour improvements and marina development along Brockville's waterfront, a new park has been created-the Armagh S. Price Park. It is located on the breakwater causeway which is in the centre of the waterfront and protects the boat basin and marina. In 1984 the cost estimates for the project were as outlined below:

1. Removal	$ 12,000
2. Excavation/Grading	9,000
3. Paving Stone Walkway	134,500
4. Limestone Screening Walkway	7,600
5. Roadway and Parking Lot	79,000
6. Concrete Curb	47,000
7. Shoreline Revetment: (assuming local rubble from construction demolition)	17,000
8. Fountain	16,000
9. Sailboard Launch Ramps	6,000
10. Railroad Display (excl. Engine)	5,000
11. Planting-Supplied & Installed	95,970
a) 2½" Caliber Deciduous Tree	
b) 2" Caliber Dwarf Deciduous Tree	
c) 6 ft. Coniferous Tree	
d) 24" Shrubs	
e) Sod	
12. Berms-Fill and Topsoil	12,000
13. Automatic Irrigation System Supply and Installation	20,000
14. Lighting-Supply and Install	192,500
15. Adventure Playground Equipment Supplied and Installed	25,000
16. Park Equipmen	6,140
a) Picnic Tables	
b) Benches	
c) Fire Pits	
17. Park Signs Supplied and Installed	10,000
18. Bicycle Rack	1,000
19. Vinyl Coated (Black) Chain Link Fence	4,400
20. Building includes servicing (water, hydro, sanitary forcemain)	180,700
	$880,760

The reconstruction of the harbour in Tunnel Bay was funded under the federal Special Recovery Capital Projects programme and the costs were as follows:

Phase 1-Demolition and Excavation	$191,442
Phase 2-Wharf Construction	448,017
Phase 3-Float Construction	129,884
Phase 4-Road work and miscellaneous services	129,052
	$898,395

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GOVERNMENT CONTACTS

FEDERAL

Small Craft Harbours Branch
Department of Fisheries and Oceans
3500 Harvester Rd.
Burlington, Ontario L7N 3M7

The Small Craft Harbours Branch is the largest single owner of waterfront property in Ontario. The Branch's mandate involves the development and maintenance of small craft harbours in Ontario. Most federal government harbours, wharves, piers and launching ramps are the responsibility of this branch

Marine Information Centre
Canada Centre for Inland Waters
P.O. Box 5050
Burlington, Ontario L7R 4K6

The Inland Waters Directorate operates on a National level with concerns for water quality and water quantity. A Shoreline Management Programme addresses flooding problems on the Great Lakes. Two research institutes in Hamilton and Ottawa carry out research in hydraulics, ice conditions, water quality and other factors related to overall fresh water policy in Canada.

Aids and Waterways Branch
Canadian Coast Guard
1 Yonge St., 21st Floor
Toronto, Ontario M5E 1E5

The Aids and Waterways Branch co-ordinates and ensures navigable waters remain so.

PROVINCIAL

Ministry of Municipal Affairs:

Responsible for community planning in the province, the Ministry ensures municipalities have the legislative authority to respond to local planning needs. Plans and policies are also submitted for review for compliance with legislative guidelines.

The Community Planning Advisory Branch will provide financial and technical assistance for waterfront studies particularly if they relate to economic strategies.

Field Offices

Central Region
Suite 207, 47 Sheppard Ave. E.
Willowdale, Ontario M2N 2Z8
(416) 224-7635, Zenith 5-2650

Southwestern Region
7th Floor, 495 Richmond St. S.
London, Ontario N6A 5A9
(519) 673-1611
Toll free: 1-800-265-4736

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Ottawa, Ontario K1N 5Y3
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Sudbury, Ontario P3A 4C4
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435 James St. S.
Box 5000
Thunder Bay, Ontario P7C 5G6
(807) 475-1651, Zenith 5-2650

Head Office
Community Planning Advisory Branch
13th Floor, 777 Bay St.
Toronto, Ontario M5G 2E5
(416) 585-6236

Ministry of Natural Resources:

Provides opportunities for resource development and outdoor recreation, and administers, protects and conserves public lands and waters. This Ministry administers the conservation authorities throughout the province. All concerns for waterlots, filling, dredging, sewage, construction on Crown lands, construction in lakes and rivers and the removal of sand and gravel require approval from the local District Manager of the Ministry of Natural Resources.

General enquiries concerning conservation authorities may be directed to:

Conservation Authorities and Water Management Branch
Ministry of Natural Resources
Room 5620, Whitney Block
Queen's Park
Toronto, Ontario M7A 1W3

Conservation Authorities Established In Ontario Under The Conservation Authorities Act

Ausable-Bayfield
Box 459
175 Thames Road West
Exeter, Ontario N0M 1S0

Cataraqui Region
R.R. 1
Glenburnie, Ontario K0H 1S0

Catfish Creek
R.R. 5
Aylmer, Ontario N5H 2R4

Central Lake Ontario
1650 Dundas Street East
Whitby, Ontario L1N 2K8

Credit Valley
Meadowvale, Ontario L0J 1K0

Crowe Valley
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Essex Region
360 Fairview Avenue West
Essex, Ontario N8M 1Y6

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Port Hope, Ontario L1A 3W4

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Halton Region
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Kawartha Region
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1136 Oliver Road
Thunder Bay, Ontario P7B 5J9

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Timmins, Ontario P4N 2G9

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217 North Front Street
Belleville, Ontario K8P 3C3

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Napanee, Ontario K7R 3S6

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Box 460
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Berwick, Ontario K0C 1G0

St. Clair Region
205 Mill Pond Crescent
Strathroy, Ontario N7G 3P9

Upper Thames River
Box 6278
Station "D"
London, Ontario N5W 5S1

Ministry of the Environment:

This Ministry regulates water routes and waterfront lands. A particular concern relates to the placement of materials in lakes and rivers and the consequences for the environment. The major tools the Ministry uses to ensure that development does not harm the environment are environmental laws and regulations, such as the Ontario Water Resources Act and The Environmental Protection Act.

Environmental Assessment Branch
Ministry of the Environment
135 St. Clair Ave. West, 7th Floor
Toronto, Ontario M4V 1P5

Ministry of Tourism and Recreation:

The concerns of the Ministry are with the marketing and business development aspects of tourism and recreation as they may be applied to waterfront development.

Industry Improvement Section
Ministry of Tourism and Recreation
77 Bloor St. West, 8th Floor
Toronto, Ontario M7A 2R9

Ministry of Northern Development and Mines:

Responsible for the delivery of Ontario government programmes in the North relating to road, rail, air and water transportation. Concern for water relates to long term economic development, where the Ministry will assist in the preparation of terms of reference for waterfront redevelopment as well as providing financial assistance for development opportunities.

Regional and Community Development Branch
Ministry of Northern Development and Mines
421 Bay St., Suite 301
Sault Ste. Marie, Ontario P6A 1X3

Ministry of Government Services:

This Ministry is responsible for the operation of the provincial government bookstore, a potential resource for information on waterfronts.

Ontario Government Bookstore
880 Bay Street
Toronto, Ontario M7A 1N8
(416) 965-2054
Toll Free 1-800-268-7540
Area Code 807: Ask Operator for Zenith 67200

RESOURCES

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1155 Yonge St.
Toronto, Ontario M4T 1W2

Canadian Institute of Planners
30-46 Elgin St.
Ottawa, Ontario K1P 5K6

Ontario Association of Architects
50 Park Rd.
Toronto, Ontario M4W 2N4

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3206 Yonge St.
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BOATING AND OTHER

Canadian Boating Federation-safety organization
4597 Kingston Rd., Ste. 203
Scarborough, Ontario M1E 2P3

Canadian Canoe Association
333 River Rd.
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Canadian Environmental Law Association
243 Queen St. W., 4th Floor
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25 St. Clair Ave. E., 7th Floor
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